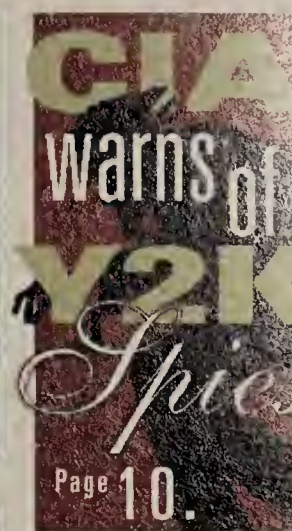


The newswweekly of enterprise network computing

NetworkWorld



September 13, 1999

Volume 16, Number 37

The network portal: www.nwfusion.com

Network management SURVEY

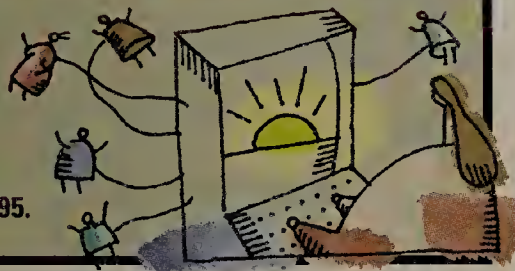
The results of our annual network management survey are in: When it comes to customer satisfaction, Cabletron's Spectrum Enterprise Manager is the winner in the enterprise category, while Hewlett-Packard's OpenView ManageX tops the field in the LAN category. For detailed results, see **page 73**.

ARE YOU READY FOR CONVERGENCE?

Take our test, and see if you're a candidate for early adoption. **Page 99**.

THE DAWN OF SERVICE MANAGEMENT

The tools that you'll need to effectively manage your service providers don't exist yet, but they're coming. **Page 95**.



C&W getting ISP act together

BY DENISE PAPPALARDO

VIENNA, VA. — Cable & Wireless USA, the second-largest ISP in the U.S., is finally starting to act the part. The company has been

wrangling with one problem after another since exploding onto the Internet service scene a year ago with its acquisition of MCI's Internet business for \$1.75 billion. The latest brouhaha involves upset
See **C&W**, page 16

What's hot at NETWORK+INTEROP 99

Cisco to offer convergence blueprint

BY JIM DUFFY

ATLANTA — Cisco this week will outline a broad voice/data convergence architecture that may have an advantage over competitors' plans: It's backed up by products that are shipping now.

Cisco's Architecture for Voice, Video and Integrated Data — AVVID — is the company's wide-ranging plan for integrating a hodgepodge of packet telephony and other technologies Cisco has obtained through acquisitions over the past five years. Ultimately, AVVID is designed
See **AVVID**, page 142

Copper gigabit fever builds

Gigabit Ethernet over copper gear to star at show.

BY JEFF CARUSO

Support for Gigabit Ethernet over Category 5 copper wiring will swell this week as vendors showcase interoperability among early versions of their products at NetWorld+Interop '99 Atlanta.

New switching gear from 3Com, Cabletron and others will join recently unveiled products from FlowWise Networks, Foundry Networks and Hewlett-Packard at the Gigabit Ethernet Alliance's booth. Most of the equipment

will start shipping by year-end.

3Com will add 1000Base-T support to a network interface card, a downlink module for its SuperStack switches
See **Copper**, page 144

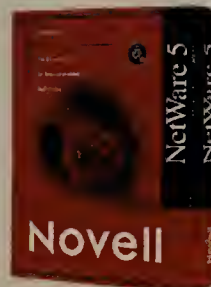
Novell adding luster to NetWare 5 clusters

BY DENI CONNOR

PROVO, UTAH — Novell customers will soon be able to efficiently cluster eight or more NetWare 5 servers, an option industry experts say may slow the migration of mission-critical applications to Windows NT.

One of the first products to cluster

more than two Intel servers, NetWare Cluster Services for NetWare 5 will be unveiled at NetWorld+Interop '99 Atlanta this week and will ship next month, Novell says.



The company has tested up to eight servers and will support that many, Novell says, though, that up to 16 servers can be clustered, but
See **Novell**, page 142

More N+I News

- Tave readies remote management probe. **Page 6**.
- Vendors prep voice-over-DSL services. **Page 12**.
- Microsoft to team with hardware vendors on VPN demo. **Page 14**.
- Nortel to air Web caching device, VPN tools. **Page 14**.
- Our guide to the hottest sessions and activities at this week's show. **Page 105**.

Online:

For Interop updates throughout the week, head online to NetFlash.

4633

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Chase is an **IBM** e-business

New integration software from IBM is helping The Chase Manhattan Bank reshape a world of systems into a single worldwide business platform. Can an IBM business integration solution help you?

To serve clients better than the competition, all Chase Global Investor Services has to do is know more than anyone else and execute flawlessly anywhere. New business integration software from IBM is helping them do just that.

In financial services, information is the raw material of new services and the bond in customer relationships – which are everything to Chase. To add value for clients, many of whom are financial leaders themselves, Chase is leveraging IT assets across business units in a dynamic new way. Instead of integrating systems one by one, they are integrating business processes from end to end with powerful new software from IBM.

This business integration software is designed to work across 100% of all systems in commercial use. At Chase, it is eliminating technology barriers among mainframes, UNIX® and Windows NT® environments, transforming Chase's custody business units everywhere into a single worldwide platform. For example, data from 83 markets and 30 external vendors is now validated automatically by MQSeries® Integrator as it arrives. Workflow is directed to the units best able to execute before market deadlines pass, affording Chase more time to analyze the world's financial information and apply it to the business.

As business goals evolve, the IT infrastructure is “already ready” to respond – a strategic advantage for Chase. “This allows us to stretch our imaginations,” says Global Technology Executive Paula Sausville-Arthus, “to deliver really powerful solutions to the business.” IBM business integration software is also stretching imaginations at companies as diverse as Toyota and Texas Instruments. You'll find their stories and others at our Web site.

For business integration case studies in different industries, InfoPack and free seminars, visit us on the Web at www.ibm.com/software/big/systems

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THIS WEEK
ONLINE



Keeping Current.

Fred McClimans is fresh from a day with Cabletron's Piyush Patel, and our columnist says it looks as though Cabletron is headed in the right direction.

While everyone was busy complaining about Craig Benson and Cabletron's lack of vision, they missed the fact that the company is reinventing itself as a billion-dollar start-up, Fred says. Find out what Patel's vision for Cabletron entails.

DocFinder: 4638

RFP Central. Are you considering installing Gigabit Ethernet backbone switches in your network? If so, let us help you get answers to your implementation questions from the top vendors. Send us your request for proposal (RFP) for the switches. We'll send the best one to participants in our Gigabit Ethernet Backbone Switch Buyer's Guide. On Dec. 6 we'll publish the vendors' detailed responses online, including a product list and pricing, along with the RFP. E-mail your RFP by Oct. 4 to sgittlen@nww.com.

Ordering out. Many users are choosing to outsource their managed WAN services. But what are the pros and cons? Also, how do you choose a provider? Let us know in this week's Fusion Forum.

DocFinder: 4639

SwitchMetric. Check out our story on Round 2 of our SwitchMetric tests (page 89), then head online to download complete results showing price/performance ratios for major LAN switches.

DocFinder: 4640

**How to get onto
Network World Fusion**

Click on Register on the home page and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Nonsubscribers must fill out an online registration form.

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WRITE: Network World, 161 Worcester Road, Framingham, MA 01701; CALL: (508) 875-6400;
FAX: (508) 820-3467; E-MAIL: nwnnews@nww.com;
CIRCULATION: CALL: (508) 820-7444;
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APPLICATION SERVERS**

How to pick a Java application server. Page 64.

FEATURES

GIGABIT ETHERNET SWITCH TESTS

We ran 12 Layer 2 and Layer 3 Gigabit Ethernet switches from seven vendors through 10 grueling interoperability tests. Find out which vendors were left standing. **PAGE 81.**

There is a new king of the hill among Gigabit Ethernet switch makers: Foundry's Turbolron/8 walked away with Round 2 of our SwitchMetric price/performance test. **PAGE 89.**

REVIEW:



IBM's Netfinity 5500 M20 server.

IBM's Netfinity 5500 M20 scored high on management and serviceability, but needs to beef up the number of PCI, hard drive and RAM slots. **PAGE 101.**



NEWS BRIEFS, SEPTEMBER 13, 1999

Andreessen o-u-t as CTO at AOL

Marc Andreessen may have more time on his hands now to knock back beers with comedian Norm MacDonald, as he does so comfortably in that new TV commercial. A scant seven months after being named chief technology officer at America Online, Andreessen is leaving that job to take a part-time advisory role with the company that bought out his beloved Netscape last November. "I'm looking forward to my new role, which will allow me to combine my desire to focus more time on getting involved with start-ups with the opportunity to contribute to AOL's future success," Andreessen explained in a statement. Feel free to read between the lines.



Andreessen will focus on start-ups.

Start-up pulls plug on Cabletron

Cabletron's Spectrum business unit was supposed to have been reborn at this week's NetWorld+Interop '99 Atlanta. A new name, new logo and new strategy were all in the works. Members of the press even received mysterious invitations accompanied by baby rattles to publicize the "rebirth."

But all those plans were scrapped late last week when the U.S. Patent and Trademark Office informed the division that the name it had chosen had been claimed already by a start-up launching at Interop. Rapid Clip Neural Systems filed for the name "Netuitive" a week before Cabletron. Spectrum officials now say the rebirth will happen by year-end.

Much ado about 9/9/nothing

It turns out 9/9/99 isn't the mark of the computing beast after all. Last week, network types saw little or no fallout from the so-called "four nines" issue. Last Thursday's date, 9/9/99, resembled an old mainframe programming signal used to halt data processing or shut down applications, and some computer experts said the four nines could cause computers to crash. If so, they must have been quiet crashes. Reuters did, however, report an unconfirmed case of "a spreadsheet that went down at a college someplace."

Lotus sours on e-Suite

It's official: The 'e' in Lotus' e-Suite now stands for extinct. Last week the company discontinued development of the Java productivity applets, which included a spread-

sheet and word processor. Lotus officials admit the software was not doing as well in the marketplace as they had hoped. Lotus shipped Version 2.0 of the e-Suite Workplace applets for Domino Server in January and next month will ship the client version of the applets. Existing customers can expect support until January 2001, according to a company spokesman.

Good news from frame forum

It should now be easier to buy frame relay bandwidth between T-1 and T-3. The Frame Relay Forum this week will announce it has passed two new standards that spell out how to bond T-1 frame relay lines together into a single logical pipe. Rather than buy an entire T-3 line and use just part of it, customers will be able to buy multiple T-1s and treat them as a single circuit. That will be useful in areas where T-3 lines are not available because carriers lack the resources.

Hackers hit U.S. embassy

Last week a hacker group calling itself the "Level Seven Crew" broke into the U.S. Embassy's Web server in Beijing and defaced Web pages by posting a long diatribe insulting the FBI, China and other hacker groups. A State Department spokeswoman acknowledged the hack, but says the embassy's computer systems weren't otherwise compromised.

E-Steel site tests its mettle

After months of tests, e-Steel, the commerce Web site for the steel industry to buy and sell goods, completed its first online trade. Michael Levin, e-Steel chairman and founder, says the two firms making the trade for "hot-roiled colis" were steel companies Cargill Ferris and Worthington. Levin says e-Steel now has 40 steel industry trading partners as members. The e-Steel commerce site is powered by BroadVision's One-to-One electronic commerce application that lets buyers communicate to a single seller or multiple sellers simultaneously. E-Steel earns revenue by claiming seventh-eighths of 1% of each completed purchase, a fee paid by the seller.

HP, USA.Net strike e-mail deal

Hewlett-Packard last week announced a partnership with USA.Net, an e-mail outsourcer, to develop outsourced messaging services for use by companies. As part of the five-year agreement, HP will invest up to \$15 million in hardware and labor to help USA.Net develop the commercial messaging service.

Tavve net mgmt. tools extend remote reach

BY JEFF CARUSO

MORRISVILLE, N.C. — To help network managers peer beyond their firewalls, Tavve Software this week will unveil a probe that collects management information from remote sites and sends it back to a central point.

At NetWorld+Interop '99 Atlanta, Tavve will announce tsc/eProbe, software that monitors a company's Web servers or other devices located at remote offices and transmits the data to a central management station. That station will run Tavve's existing management software, in conjunction with Hewlett-Packard OpenView or Tivoli NetView.

The company is planning to sell the probe as a hardware/software package in the form of a PC running Linux. The PC would connect to a network via a 10/100M bit/sec Ethernet card.

This configuration appeals to Jim Gross, manager of the telecommunications department at Lockheed Martin. Already a Tavve customer, the company has many remote sites but doesn't have network management experts at those sites.

"If we had multiple OpenView platforms across the network, we'd need to have somebody to baby-sit them on-site," Gross says.

Alternatively, Gross would

like to be able to ship the new probe to remote sites, where someone without a lot of network knowledge could just plug in the power and the network connections.



Then the probe could send management data to the network managers remotely.

The probe is a good idea for companies facing scalability issues, says Valerie O'Connell, director of enterprise management at Aberdeen Group, a consulting firm.

"There's not going to be a chicken in every pot — an eProbe at every destination," she says. But the probe's low cost and simplicity will make it appealing to some large companies.

The probe polls network devices using SNMP, and it uses ping to check the response times of different devices.

The probe could reside inside a firewall at a remote site. It could filter out redundant traps, sending critical messages back through the firewall and across the Internet to a management station at a central site.

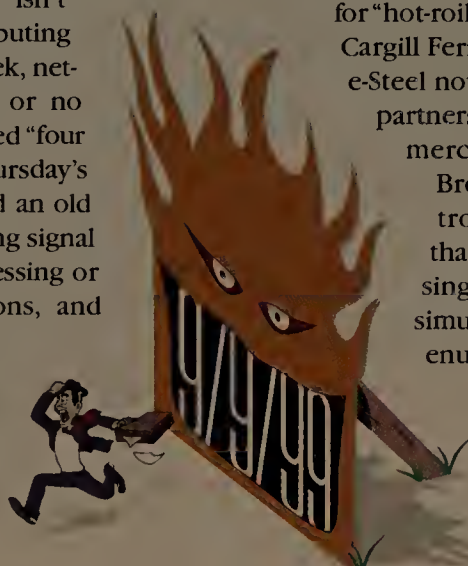
The management station, using Tavve's tsc/EventWatch, which correlates events, will help network managers locate where a failure is occurring.

The probes get around the problem of duplicate IP addresses, says Michael Tschirret, director of marketing and product management at Tavve. With multiple remote sites, it's possible to have the same IP addresses exist at different sites, he says. This can be confusing when probes at different sites report back and refer to the IP address. But each probe tags messages differently, Tschirret says.

The tsc/eProbe is expected to be bundled with Red Hat Linux 6.0, running on a Pentium II processor at more than 350 MHz.

The probe is scheduled to ship by year-end. The hardware/software package will cost about \$7,500.

Tavve: www.tavve.com



Be a
Net Know-It-All
For the answer to this week's question and more net trivia, visit NetworkWorldFusion.com and enter 2467 in the DocFinder box.

This week's question:

What words are behind the ugly new acronym EAPOE?

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Interoperability issues bite Win 2000 Kerberos scheme

BY JOHN FONTANA

Despite implementing standards-based Kerberos authentication in Windows 2000, Microsoft is facing interoperability difficulties with other standard Kerberos systems. But the company says it is now working diligently behind the scenes to solve the problems.

The issues center on security "tickets," known as Key Distribution Centers (KDC), that are generated by Kerberos servers. Microsoft's KDC, which is tied to Active Directory and bolted into Windows 2000, adds proprietary data to the ticket. The result is that tickets generated by third-party KDCs are not able to access Windows resources and vice versa, even though the KDCs are built around the same IETF Kerberos v5 specification.

Users of existing Kerberos systems could face a painful forklift migration to Windows 2000, or be forced to absorb the administrative burden of maintaining synchronization between disparate systems in

the future.

"Microsoft is not doing anything to further the use of Windows 2000 in mission-critical environments," says Eric Hemminger, an analyst with Aberdeen Group in Boston. "The company has some major implementation issues, and it's making users go out and solve the problems."

KDCs act as trusted third parties, providing security tickets that clients and servers can exchange using secret-key cryptography to prove their identities and establish encrypted communication. Ideally, KDCs maintain trust relationships and create a single sign-on to access resources regardless of what network operating system is being used. Most KDCs can authenticate to each other, but fail when trying to authorize use of network applications or services.

Microsoft is guarding its proprietary authorization ticket for now and binding users to its KDC. The default authentication for Windows 2000 is Kerberos, and that is likely to revive interest in the standard.

Kerberos is popular in the financial, insurance and telecom industries and with multinational corporations.

"It would be nice to get the Windows 2000 server to play in the Kerberos environment," says Al Williams, director of distributed systems services at Pennsylvania State University's Center for Academic Computing. He has more than 200,000 Kerberos user IDs on a Unix KDC based on Distributed Computing Environment (DCE), which Williams says he won't move to Windows 2000.

"In essence, Microsoft wants us to convert our Unix KDC to a Windows 2000 KDC," Williams says. Williams cannot authenticate users using the Unix KDC and authorize the use of Windows 2000 resources. His only alternative is to use a Microsoft tool to mirror his Unix-based user IDs against Windows user IDs. He has already rewritten code on NT Workstations so they can authenticate against his KDC.

Microsoft says it understands the issues and will provide answers in the coming months so large customers can protect their investments. But critics say Microsoft has consumed yet another standard and extended it to snare users.

"Microsoft is not pushing Kerberos as much as it's pushing its Windows authentication scheme that looks and smells like Kerberos," says Jeff Schiller, security area director at the Internet Engineering Task Force.

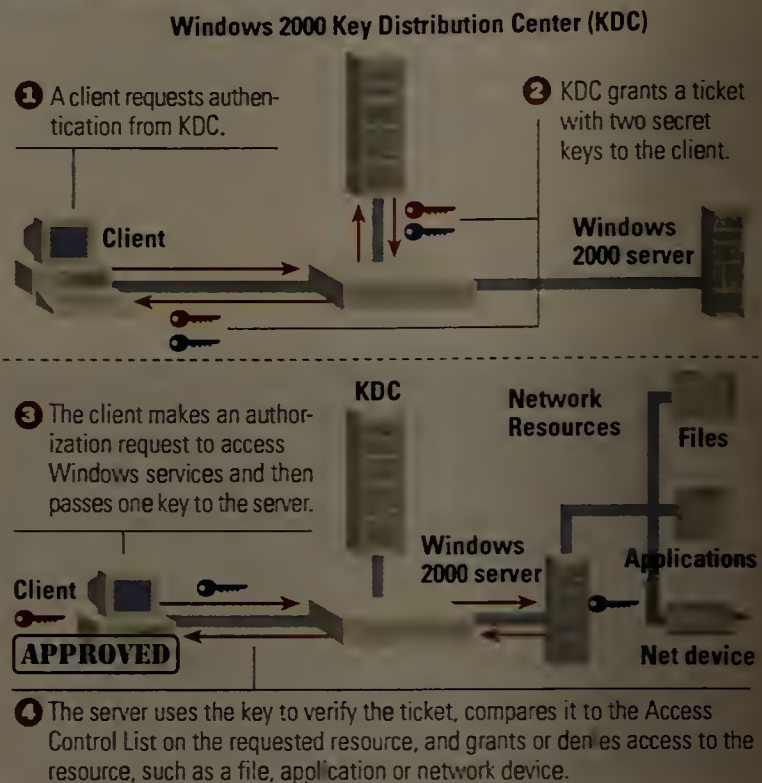
Microsoft did follow the IETF's Kerberos v5 specification as written, but used an authorization mechanism, the so-called auth-data field, on the Kerberos ticket to insert Windows Secure ID information that binds the ticket to Windows Access Control Lists.

"The problem is that the data is specific to Windows and only valid in Windows," says Dan House, senior technical engineer at IBM. "Ideally, there would be a system that creates a common user ID. The IETF left the auth-data field open to vendor interpretation, a move it now regrets and is working to correct."

The Open Group, which developed DCE Kerberos, and the Massachusetts Institute of

Security services

Microsoft is supporting standards-based Kerberos in Windows 2000. Here's how it works.



Technology also use the auth-data field to provide user ID, but they publish the data format so other vendors can support it.

Microsoft so far hasn't done that. "Microsoft refuses to release that documentation," says Paul Hill, a senior MIT programmer analyst and a member of the Kerberos v5 development team. "Our definition of interoperability takes into account client/server. Microsoft at the client level says, 'You need our server.'"

Microsoft says the data format is forthcoming. "We'll publish the documentation when it's finalized and we ship the product," says Shanen Boettcher, product manager for Windows 2000. "We definitely want to support user accounts in different KDCs. That is the goal."

Microsoft is working with CyberSpace, according to officials at CyberSpace. CyberSpace develops a sort of middleware called TrustBroker, which links Kerberos deployments. "Microsoft has come to us and asked for help on its interoperability story," says Matt Hur, director of the advanced technology group at CyberSpace. "We can broker common authentication across platforms regardless of user ID and help form trust relationships between different Kerberos realms."

The approach is similar to the one Microsoft used with technology it acquired two months ago from Zoomit to help synchronize Active Directory with other directories, after users complained of being locked into the Windows environment. ■

More breaking news

Network World Fusion now has more news than ever. Check out these stories online:

American Express aims blue card at 'Net shoppers

It's been green, gold and platinum. Now American Express is releasing a blue version of its well-known credit card specially designed for shopping online. Called Blue, the new card contains a smart chip that will offer customers additional security in their Internet-based transactions when used in combination with a smart card reader.

DocFinder: 4641

New Intel switches, routers aimed at midsize nets

Continuing its push into the network systems business, Intel announced the release of new switches and routers designed for midsize networks. Key to the new family of products is Intel's new 6000 Series Switch, a modular Gigabit Ethernet device that offers up to 32 Gigabit Ethernet ports.

DocFinder: 4642

Salomon Smith Barney taps XML

Salomon Smith Barney is adopting XML for presentation of its research materials on the Web. The goal? To help investors and analysts quickly find specific information.

DocFinder: 4643

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DocFinder: 3850



Corrections

A recent story (Aug. 30, page 17) inaccurately listed the price of the Expand Accelerator 4000. The gear costs \$25,000 per pair.

For clarification, Expand President Talmon Marco founded the company in 1998.

In our recent review of network monitoring tools (Aug. 23, page 56), we failed to note that Ipswitch's WhatsUp Gold offers notification by prerecorded telephone messages, as well as program and group notifications for response teams. The product's Web console lets you create multiple password-protected user accounts and can grant or deny access based on a single IP address or a range of IP addresses.

Are You Open To A New Point Of View?

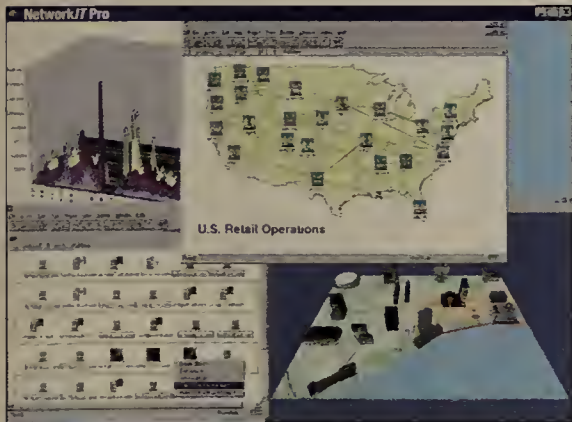
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DNS Discovery	✓	
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Frame Relay Option	✓	
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Threat of 'infowar' brings CIA warnings

Y2K work has given foreign-born programmers 'unprecedented access' to U.S. computer systems.

BY ELLEN MESSMER

ARLINGTON, VA. — Some might call it paranoia, but the U.S. government is growing increasingly worried that foreign infiltrators are building secret trap doors into government and corporate networks with the help of foreign-born programmers doing Y2K-related work.

A CIA representative last week named Israel and India as the countries most likely to be doing this because they each handle a large amount of Year 2000 software repair not done by U.S.-born workers. According to the CIA, the two countries each have plans to conduct information warfare and planting trapdoors wherever they can would be a part of that.

Information warfare is a nation's concerted use of network hacking, denial-of-service attacks or computer viruses to gain access to or disrupt computer networks, now the heart of modern society in terms of banking, telecommunications and commerce.

HERF guns work

Though still secretive about the practice, nations are also building futuristic radio-pulse devices — popularly called High Energy Radio Frequency (HERF) guns — that can disrupt or destroy electronics in networks, cars, airplanes and other equipment by sending an energy beam at them.

A homemade version of a HERF gun successfully disrupted a PC and a digital camera during a demonstration last week at a session of the Infowar conference. This conference typically draws a large crowd of government spooks and high-tech strategists from around the world.

Y2K work is giving foreign programmers "unprecedented access to computer systems," Terrill Maynard, the CIA's chief of analysis and warning, said at the Infowar conference. He works at the National Information Protection Center, which is the

government organization housed at the FBI that keeps a watch on threats to the U.S. cyberinfrastructure.

While Maynard calls Israel and India the key suspects for planting software backdoors in American systems, Russia is also viewed as a threat because it has defensive and

"People are spending a lot of money on cyberweapons."

Robert Garique, chief technical officer, province of Manitoba, Canada

offensive information warfare programs underway. Cuba and Bulgaria are working on computer-virus weapons, he says. But Maynard claims Israel has already hacked its way into U.S. computer systems to steal information about the Patriot missile.

With most Y2K work completed, "action options are few at this date," Maynard says. He recommends that IT departments closely examine the Y2K code that went in their systems and also run extensive checks on network security.

In the 21st century, the threat of nuclear war is being displaced by that of information weapons, said another conference speaker, Igor Nemerov, general counsel of the Russian Embassy. "We can't allow the emergence of another area of confrontation," Nemerov said, adding that Russia is calling for "cyberdisarmament."

The first step in the cyberdisarmament process is to get the nations of the world to discuss the issue openly, Nemerov said. Russia recently requested that the United Nations ask member countries to recognize the threat and

state their views on it.

The U.S. Department of Defense has complained in meetings with Congressional subcommittees that it has seen severe network-based attacks coming from Russia. Congress has become convinced there's a big problem — and not just with Russia. Rep. Curt Weldon (R-Pa.) made an appearance at the Infowar conference last week to say he thinks information warfare is a bigger threat than biological or nuclear weapons.

When asked by *Network World* if Russia carries out

network-based attacks on U.S. computer systems, Nemerov conceded that sometimes things do happen, but "it's unauthorized."

Robert Garique, chief technical officer for the Canadian province of Manitoba, said he favors cyberdisarmament talk. Garique noted that new hacking tools, such as one called nmap, make it very hard to be sure where a network-based attack is originating because the tool makes it easy for the attacker to spoof his identity.

Easy to make

But more than traditional hacker techniques constitute infowar. A new genre of high-energy radio-pulse weapons that disable electrical flows are under development in government labs around the world. "People are spending a lot of money on cyberweapons," Garique said.

But how easy is it for terrorists or other criminals to build their own homemade HERF guns? That has been a topic of much debate, but last week a California-based engineer, David Schriner, demonstrated it's not very hard.

Schriner, president of Schriner Engineering and a former engineer at the Naval Air Warfare Center, hooked up a 4-foot parabolic antenna powered by ignition coils and parts from a cattle stun gun during one Infowar session. People with pacemakers were asked to exit the room.

With not much more than \$400 in parts, he directed a 300-MHz pulse at a computer running a program. Blasted in this manner from 10 feet away, the computer went haywire and a digital camera twice that distance away was affected.

"It's high-school science, basically," says Schriner, who believes that as this kind of threat becomes better understood through research, the computer industry is going to have to sit up and take note. "It's going to cost an extra nickel or dime to put a shield in a computer where it's needed," he says. ■

E-espionage scorecard

The CIA is concerned that certain countries involved in Y2K fixes may also be involved in industrial espionage or offensive information warfare (IW).

Country	Industrial espionage	Offensive IW initiative	Major US Y2K fix provider
Bulgaria	No	Yes	Limited
China	Yes	Yes	No
Cuba	Yes	Limited	No
France	Yes	Yes	No
India	Yes	Yes	Yes
Iraq	Yes	Yes	No
Ireland	No	No	Yes
Israel	Yes	Likely	Yes
Japan	No	Yes	Likely
Pakistan	No	No	Yes
Philippines	No	No	Yes
Russia	No	Yes	Yes
South Korea	No	Yes	Yes

SOURCE: CIA, WASHINGTON, D.C. WITH THE NATIONAL COMMUNICATIONS SYSTEM

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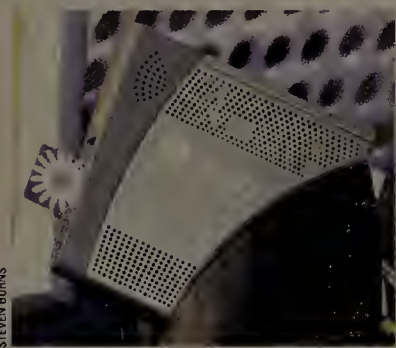
Thin-client rivals unveil new products

BY JOHN COX

Thin-client computing was back in the news last week with a resurgent Sun taking on an army of Windows-based Terminal vendors.

Despite their differences, both camps have the same focus: moving hard-to-maintain applications from PCs to powerful, centrally managed servers.

Sun, which has struggled to sell its JavaStation concept, last week introduced the Sun Ray 1 Enterprise Appliance. While



Sun last week unveiled a desktop thin client that plugs into almost any monitor and accesses Windows and other applications running on servers.

JavaStations were designed largely for new Java programs, Sun Ray is more realistic. The device can access data and applications on an array of servers, including Windows applications running on multi-user NT servers. From Microsoft partner Citrix Systems, Sun licensed software that accesses NT programs.

In contrast, the JavaStation was limited to some rudimentary Java business applets and to accessing Unix servers via X.11 software. JavaStations also included Java systems software on the client itself. The Sun Ray lacks even this, in order to stay as thin as possible.

Instead, Sun has client software, called Hot Desk, that handles only keystrokes, mouse-clicks, pixel display and audio. On the server, Hot Desk takes care of everything else, including the graphical user interface.

As a result, a user can pull his smart card from his Sun Ray and move to another Sun Ray or

to any other device with the Hot Desk code, Sun officials say. When the user plugs the card back in, the server will bring him back into the application precisely where he left it.

"This establishes a totally new architectural model," says David Jordan, a consulting engineer with a unit of network vendor Ericsson in Research Triangle Park, N.C. "People's personal information management data is maintained by a back-end server, but the information is always available through a wireless personal digital assistant or other similar thin-client device."

The elegantly curved Sun Ray 1 box, priced at \$499, comes with a keyboard, a mouse and some systems software on a memory chip, and supports an array of VGA and high-performance color monitors.

Windows fights back

Last week also saw several product announcements at Citrix's iForum '99 conference in Orlando.

IBM and Hewlett-Packard unveiled new desktops, with IBM touting better price-performance because it ditched its PowerPC processors for less-expensive Intel CPUs. HP's terminals targeted different classes of corporate users and offered a migration path to a Linux-based terminal that could also independently access Unix, mainframe and Web applications.

The market for thin clients will explode, according to Eileen O'Brien, an analyst at International Data Corp. Thin-client vendors shipped 305,000 units during the first half of 1999, almost twice the number shipped in all of 1998.

O'Brien says the experience of the past few years confirms that thin clients are easy to use, save customers money and aid in information access. Last spring, an IDC report forecast that 1999 shipments will hit 1.2 million desktop units this year and six million by 2003. ■

That voice you hear may be from DSL

BY TIM GREENE

ATLANTA — Digital subscriber line vendors at NetWorld+Interop '99 Atlanta will deliver a flurry of gear and services that promise to broaden the appeal of using DSL technology to deliver data and multiple voice channels over a single copper link.

The idea behind these new wares and services is that many organizations may soon be able to buy integrated, full-featured DSL-based voice and data services for their branch offices.

Two competitive local exchange carriers (CLEC), Primary Network Communications in St. Louis, and Picus Communications in Virginia Beach, Va., will announce plans to offer such voice-over-DSL services.

Picus will support its service with CopperComplete DSL gear from CopperComm, while Primary will use Lucent's newly announced Stinger DSL access concentrator to support its service. Details about the service speeds and prices were unavailable at press time.

able at press time.

The attraction of voice over DSL to enterprise customers is that a single phone line can be refitted to supply multiple phone channels and a data channel, which are sufficient to support branch offices. Customers also have the option of adding and dropping voice channels more rapidly because the process does not involve sending a technician out to string or disconnect wires.

At Interop, Lucent will demonstrate interoperability between Stinger and DSL equipment from Jetstream Communications. Lucent also says it has plans for Stinger to interoperate with DSL voice gateways made by CopperCom and Tollbridge, but Lucent will not demonstrate with these vendors at the show.

Jetstream's customer equipment converts voice traffic to ATM cells and sends them out on a DSL line. Lucent's Stinger terminates the DSL line and trunks the ATM stream onto the carrier's backbone. There, a Jetstream voice gateway turns

the ATM voice cells into circuit-switched voice, which it sends into the traditional phone network to complete the call.

The Lucent gear streamlines the network needed to support DSL services, according to Claudia Bacco, an analyst with TeleChoice, a telecom research firm in Boston. Until Stinger, DSL multiplexers fed into ATM access switches that trunked traffic into carrier backbones. But Stinger has ATM switching inside, cutting out the need for a free-standing ATM access switch. That means CLECs can set up their networks for less money and can afford to charge lower prices for their services.

Stinger supports all flavors of DSL and can support ATM or frame relay over a DSL circuit.

AccessLan Communications, another DSL vendor, claims it will announce at the show that a CLEC will soon use its gear to support a voice-over-DSL service, but would not give details.

Lucent: www.lucent.com; Picus: www.picus.com; Primary: www.primarynetwork.com; CopperCom: www.coppercom.com; Tollbridge: www.tollbridge.com

IBM's software offering will tie security, QoS

Company's SecureWay unit to boost LDAP directory.

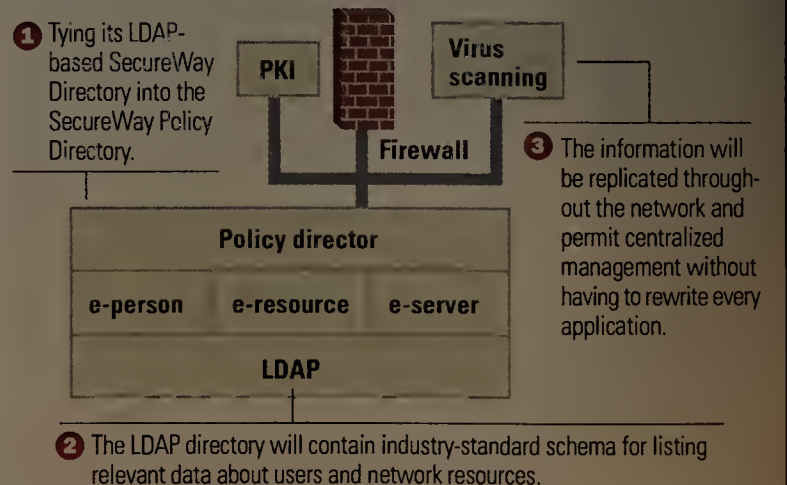
BY MARC SONGINI

RALEIGH, N.C. — Hoping to simplify policy control over far-flung security and network products, IBM's Networking Computer Software Division intends to make its suite of FirstSecure products centrally manageable.

FirstSecure's offering contains antivirus software, firewalls and encryption tools, among other products. The offerings are from IBM and other vendors. IBM says that over the next six months, it will offer a framework to make FirstSecure, along with products from other vendors, simpler to manage. As a result, IS staff will be better able to enforce security and quality-of-service (QoS) policy rules throughout the enterprise.

Security setup

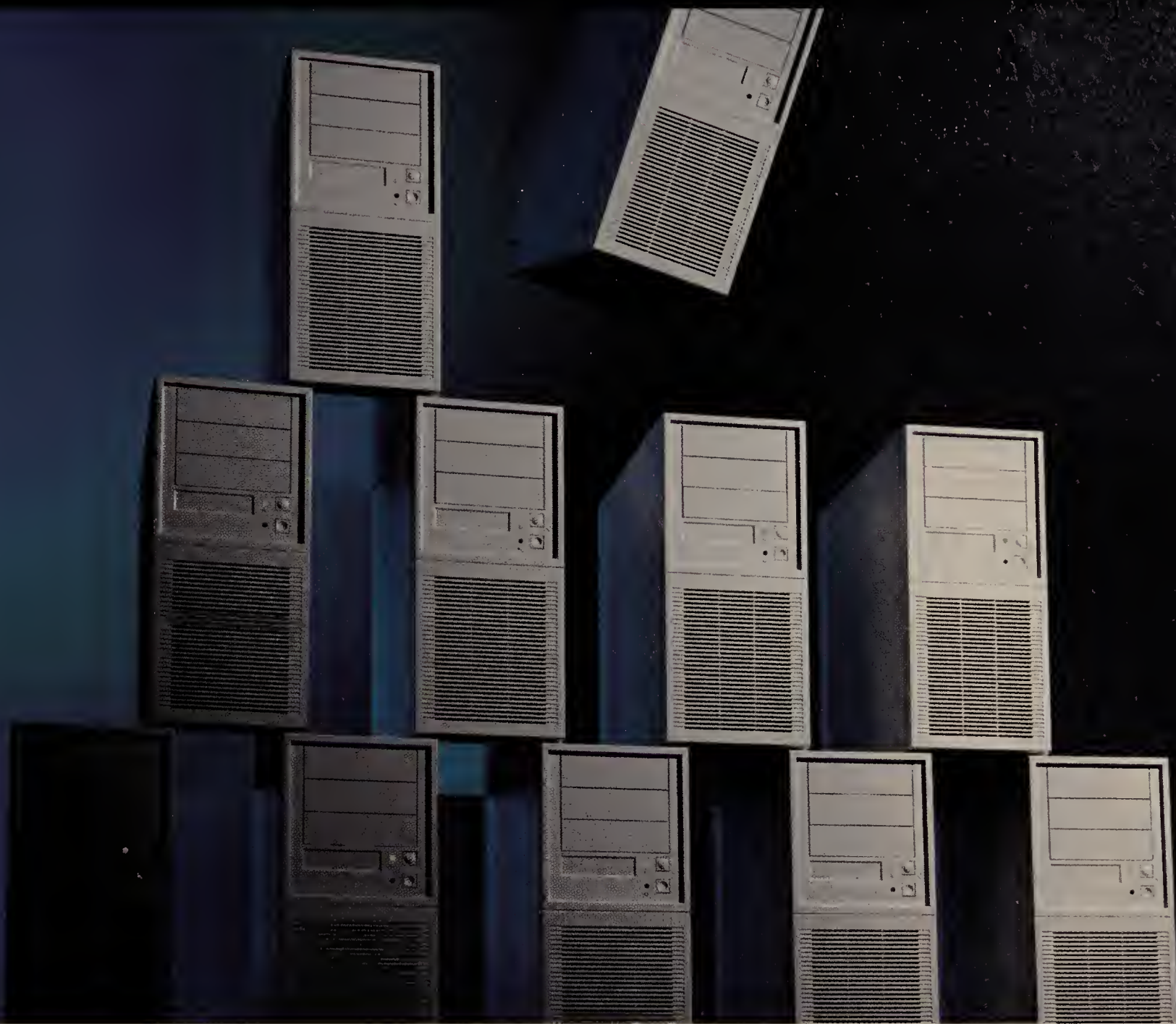
IBM wants to make its multiple security products more centrally manageable. The company's plans include:



Security and other network vendors use a variety of ways to store data about users and applications, says Bob Madey,

an IBM executive. A firewall may store directory data in one type of file, while a See IBM, page 16

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Nortel to unveil Web access, VPN wares

Interop rollout includes cache appliance, hardware and software upgrade for extranet switch.

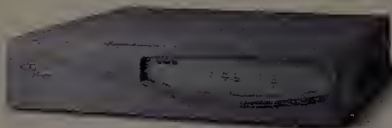
BY JIM DUFFY

SANTA CLARA, CALIF. — Nortel Networks this week will announce two new offerings that let users quickly access Web sites and implement secure virtual private networks (VPN).

At NetWorld+Interop '99 Atlanta, Nortel will roll out the BayStack 910 Web Cache Appliance, which is designed to help small and midsize businesses make more efficient use of WAN bandwidth by caching frequently accessed Web addresses.

Nortel's Web Cache Appliance is a hardware device that combines a browser application with a built-in hard drive. It sits between a router and a hub or switch and stores Web

addresses in cache memory, cutting the time a browser takes to search for Web pages and handle multiple requests.



Nortel's BayStack 910 Web Cache Appliance debuts this week.

The Web Cache Appliance will also check to make sure nothing has changed on a Web page prior to pulling it out of its memory. If the appliance detects something different, it will pull the new Web page.

Because this product has been developed specifically for the small and midsize business market, Nortel's Web Cache Appliance can be installed sim-

ply by plugging it in, the company claims. The unit self-configures and requires no reconfiguration of the router, hub or switch to which it is connected, Nortel says.

"The box was installed in under five minutes," says beta user Charles Vaughn, senior vice president at Telecommunications KLRN-TV in San Antonio, Texas. "Internet access was disrupted for the time it took to patch the box in to and out of the T-1 circuit and boot up the device."

Other beta users are impressed with the BayStack 910's ability to boost the performance of circuits running at less than T-1 rates.

"It probably tripled our Internet response time," says Belinda Kromer, IT coordina-

tor at the San Antonio Academy. "We are using an ISDN line; we don't have a T-1 yet, so [the BayStack 910] was almost a necessity for us."

The BayStack 910 will compete against Cisco's Web Cache Engine 505 and caching products from Cobalt Networks and CacheFlow. It costs \$3,695 and is available now.

For VPNs, Nortel will unveil new hardware and software for its Contivity Extranet Switch that support hardware-assisted encryption, VeriSign's public-key infrastructure (PKI) digital certificates and increased WAN connectivity.

Nortel has a new Application Specific Integrated Circuit (ASIC) for the Contivity switch that enables the device to achieve encryption speeds

beyond 200M bit/sec and route forwarding speeds between 250,000 and 300,000 packet/sec.

Nortel will also unveil two WAN cards that provide T-1 DSU/CSU and single port E-1 V.35 connectivity to IP networks without the need for a router.

Version 2.6 of the Contivity software adds VeriSign's PKI digital certificate technology for user authentication. Contivity already supports Entrust certificates.

Version 2.6 will be available as an upgrade for Contivity customers, either through a maintenance contract or as a purchase.

The new hardware-encryption ASIC comes factory installed for new customers for \$2,400 or as a field upgrade to existing customers for \$2,800. Pricing for the WAN cards was not disclosed. All products will ship in the fourth quarter.

Nortel: www.nortelnetworks.com

Microsoft struts Windows 2000 VPN features

BY TIM GREENE

ATLANTA — Microsoft this week will offer a glimpse into the future world of virtual private networking, a realm where it claims users won't worry about custom clients and can easily set up VPNs with business partners.

Microsoft is teaming with Cisco, Nortel Networks, 3Com, Altiga Networks and Routerware to show that Windows 2000 can establish and maintain VPNs over the Internet based on IP Security (IPSec) standardized encryption.

The interoperability of Windows 2000 tunneling with other vendors' equipment means it will be easier to set up corporate VPNs, says Craig Darling, a network analyst with IDEX Laboratories, a veterinary-products testing firm in Westbrook, Maine.

In a Windows 2000 shop, network managers won't have to distribute VPN clients because they will already be on end-user PCs as part of the operating system. "You don't

have to worry about getting an IPSec client out to them.

Orchestrating that for 2,000 or 3,000 users is quite a chore. You also won't have to orchestrate distribution of new software versions," Darling says.

Interoperability also gives customers the flexibility to buy VPN equipment from multiple vendors. For example, customers can use more than one vendor to supply VPN gateways at different corporate sites, but they can still use the Windows 2000 client to connect to all of them.

Mixing and matching VPN gateways would let Windows 2000 shops set up branch-office VPN connections using Windows 2000 Server, while using more powerful, specialized gateways from other vendors at central sites.

With better compatibility among VPN vendors, customers can also easily establish VPNs with business partners. Without interoperability, partners have to haggle over which common VPN platform they will share.

The VPN demonstration relies on using previously

shared encryption keys. Microsoft is having interoperability trouble with its mechanism for exchanging keys on the fly (see story, page 8).

Microsoft's new VPN software replaces its current VPN offering in Windows 98, Point-to-Point Tunneling Protocol.

In Windows 2000, L2TP and IPSec are used in combination.

The NetWorld+Interop '99 Atlanta show will run a VPN interoperability test on its Interop Labs network. Vendors will try to establish IPSec tunnels and pass data with as many vendors as possible. Parti-

cial configuration when new concentrators or subnets are added to the VPN, Darling says.

Altiga also is announcing support for two public-key standards that will enable its VPN Concentrators to talk to more vendors' public-key infrastructure gear. The standards, known as PKCS7 and PKCS10, make it easier for Altiga's Concentrators to share encryption keys with gear made by other vendors.

Windows 2000 shows VPN support

At NetWorld+Interop '99 Atlanta this week, Microsoft will demonstrate that its Windows 2000 platform interoperates with virtual private network gear from other vendors in three scenarios:

- A Windows 2000 client connecting to non-Windows 2000 VPN gateways (3Com, Nortel Networks and Cisco)
- A Windows 2000 gateway connecting with non-Windows 2000 gateways (Altiga and Cisco)
- A Windows 2000 gateway connecting to a non-Windows 2000 client (Routerware)

PPTP was a first stab at creating secure encrypted tunnels over the Internet, but many users felt the protocol was too weak.

IPSec uses Triple Data Encryption Standard and is considered more secure. Now Microsoft can say it supports the highly regarded IPSec standard as well as Layer 2 Tunneling Protocol (L2TP), which is on its way to becoming a standard.

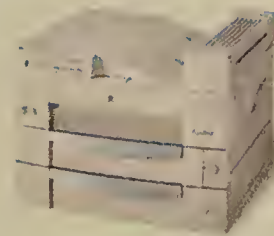
Participants are Check Point Software, Cisco, Compatible Systems, Datafellows, Intel, InterDyn, Linux Free S/Wan, Microsoft, NetScreen, Nortel Networks, Radguard, RedCreek, VPNet and Xedia.

In other VPN news, Altiga is announcing auto discovery, a feature that enables multiple Altiga Access Concentrators to automatically advertise the internal IP addresses at each site. That ability eliminates man-

NetScreen Technologies will introduce a new VPN appliance called NetScreen-5 for branch offices. The device sits between branch-office LANs and branch-office WAN connections. NetScreen-5 provides a firewall, traffic shaping and IPSec tunneling. The device ships this week for \$1,500.

Microsoft: www.microsoft.com; Altiga: www.altiga.com; NetScreen: www.netscreen.com

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MINOLTA

IBM,
continued from page 12

Windows NT server might have a different type of directory, and so on. As a result, it is difficult to get disparate directories to talk to each other, and thus ensure that users get appropriate resources and QoS guarantees.

IBM intends to overcome these difficulties by allowing two existing software products to share data: IBM's Lightweight Directory Access Protocol (LDAP)-based SecureWay Directory and the SecureWay Policy Director.

SecureWay Directory, now in Version 3.1.1, is based on IBM's DB2 database and permits applications to authenticate end users to give them access to appropriate resources. The SecureWay Policy Director integrates the individual products in the FirstSecure lineup and ensures that network rules are enforced.

Additionally, IBM will implement a new method of formatting its directory data that will enable authentication and user privilege information to be shared across the entire network, regardless of the underlying security software platform.

IS staff can thus avoid having to manually replicate the data for each individual security or network application, IBM claims.

These proposed directory schema are in the process of being approved by the Internet Engineering Task Force (IETF), IBM says. The first format IBM plans to add to the SecureWay Directory is code named "e-person." This format will let IS staff enter data about individual users — including access rights and the priorities they receive when competing for the same applications.

Later, as the IETF standards are ratified, IBM will add the e-server and e-resource schema. E-server will be used to format information about the location and available resources on LAN servers. The e-resource schema will handle data about network applications, such as their locations and availability.

Any vendor that writes its applications to the LDAP standard can use SecureWay Policy Director. Currently, the director supports Distributed Computing Environment technology, but with FirstSecure 2.0 coming out in October, Policy

Director will also support LDAP data.

IBM is taking a lead in directory-enabled networks, says Tim Sloane, an analyst with the Aberdeen Group consultancy in Boston. Other companies such as Microsoft and Sun are talking about creating schemas for centralized directories, but it remains unclear exactly how they will do it. "IBM is being aggressive and making all its services and systems adopt a standard," he says. "I haven't heard Oracle or Microsoft say how they're going to implement these standards." ■

C&W,
continued from page 1

customers whose service was shut off a month ago and has not been restored.

But company officials last week outlined for *Network World* an aggressive plan to turn things around. The plan includes:

- A \$3 billion worldwide network upgrade spread over three years based on ATM and optical gear from the likes of FORE (now part of GEC), Juniper Networks and Ciena.
- The company's first IP virtual private network (VPN) service.
- A managed firewall offering.
- New application service provider and Web-hosting efforts.
- An integrated billing system that will let customers receive one bill for using voice, data and Internet services.

Customers say it appears that Cable & Wireless is getting its Internet services act together. "Our Internet link is always nailed up and customer service is much better than it was with MCI," says one customer who was transferred from MCI to Cable & Wireless after the two carriers struck their deal. Early on, it was taking Cable & Wireless months to fill upgrade orders, says the customer, who requested anonymity.

But it's been a long 12 months since MCI sold its Internet business to Cable & Wireless as part of MCI and WorldCom's agreement with the government to approve their merger. The government frowned on the union of MCI's big Internet network with WorldCom's UUNET backbone,

the biggest Internet service backbone in the market.

The 'Net business buyout hasn't gone nearly as smoothly as Cable & Wireless would have hoped. In March, the company filed a lawsuit against MCI WorldCom that claims the carrier did not send enough employees to Cable & Wireless to support the Internet business.

The strained relationship between MCI WorldCom and Cable & Wireless also appears to be at the heart of the carriers' latest ordeal — a service cutoff for more than 70 business customers, according to sources.

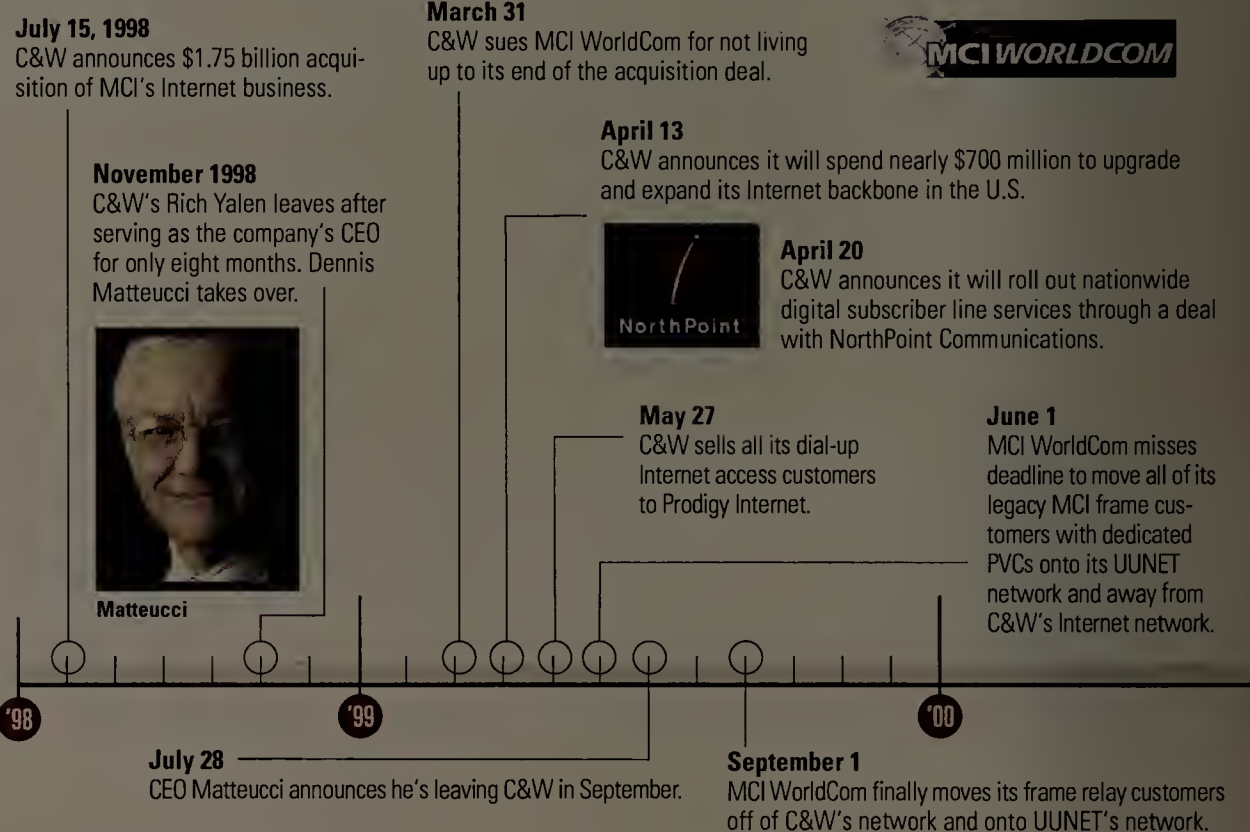
Under an agreement between the carriers, Cable & Wireless in June was permitted to terminate certain MCI WorldCom frame relay customers' access to Cable & Wireless' Internet backbone. Cable & Wireless agreed to extend that deadline to give MCI WorldCom more time to transition these customers to the UUNET backbone. But after a three-month extension, Cable & Wireless last month turned off its gateways and some MCI WorldCom customers have yet to regain Internet access.

"We were never notified about the termination, and we were never even notified that another company was managing our Internet traffic," says Bob Finch, network manager at Utilities Service Alliance in Overland Park, Kan. The company, which was still without Internet access as of press time, is now shopping for a new ISP.

Cable & Wireless says it did not turn off any frame relay permanent virtual circuit (PVC) connections without permission from MCI WorldCom. MCI WorldCom claims it sent letters in February and March to all its

Turbulent days at Cable & Wireless USA

Cable & Wireless has weathered a fair share of storms since it acquired MCI's Internet business one year ago.



frame relay customers that had dedicated PVCs to Cable & Wireless' Internet network, notifying them of the change. Account teams also made direct contact with customers, the companies say.

Cable & Wireless is looking to put its problems behind it by upgrading its network and rolling out new services.

In April, Cable & Wireless announced plans to spend \$670 million on its domestic IP network this year. That money is going toward buying new FORE ASX 4000 ATM switches, Juniper Networks M40 routers and Ciena dense wave division multiplexing fiber-optic transport equipment.

At NetWorld+Interop '99 Atlanta this week, the service provider will announce that the

East Coast portion of its Internet backbone now runs at OC-48 speeds, up from OC-12 in most parts of the network. By early 2000, the company's entire network will be kicked up to OC-48, and in 2001, network capacity will skyrocket to OC-192, says Arthur Medici, a senior vice president at the company. The higher-bandwidth backbone should let Cable & Wireless support more customers and offer them faster Internet access links.

The company is also in the process of building new dial-up Internet access facilities and replacing 3Com/U.S. Robotics gear with Cisco equipment, says Jeffrey Young, chief engineer for Cable & Wireless' Internet solutions division. Cable & Wireless plans to

deploy Cisco AS5300 and AS5800 routers that support voice, fax and dial-up traffic. This gear will support new services that the company plans to roll out over the next eight to 10 months, Young says.

Among the most anticipated new services will be the company's first IP VPN offering, which Medici says will be announced by the end of this month. The service will support the IETF's IP Security encryption and authentication specification, he says.

Many of Cable & Wireless' competitors are already offering second-generation VPN services. ■

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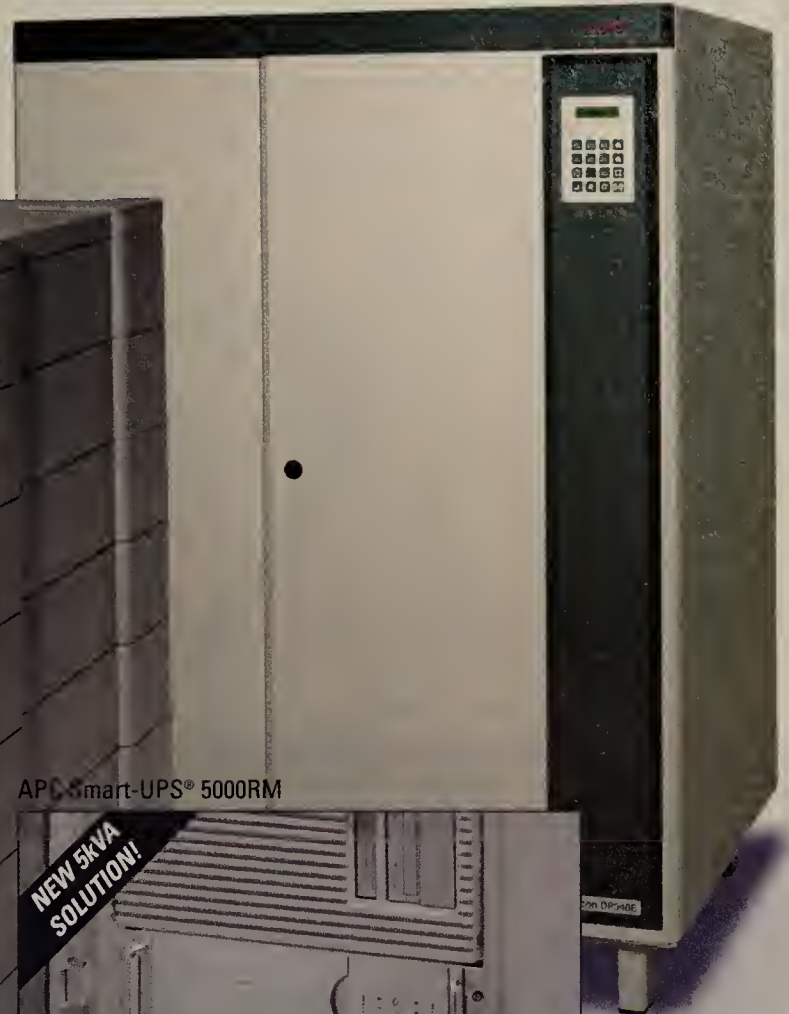
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Dell's first-ever acquisition fills high-end storage need

Hardware maker snaps up Convergenet in stock transaction valued at \$348 million.

BY DENI CONNOR

AUSTIN, TEXAS — Dell customers soon may be able to attach a storage device of any type or size to any server, following the company's acquisition last week of Convergenet.

Dell's first-ever acquisition will also let the company enter the high-end storage market for a relatively modest investment, analysts say. Dell will acquire Convergenet, a privately held company, in a stock transaction valued at \$348 million.

Convergenet was due to roll out hardware and software dubbed "storage domain manager" that would let virtually any host computer connect to any type of storage device without regard to operating

system or platform.

"Convergenet is on the leading edge of research and development of data class storage for storage-area networking," says Tom Meredith, senior vice president and chief financial officer at Dell.

With the Convergenet software and hardware, it would be possible to connect a Dell PowerEdge server running Windows NT to a high-end Hewlett-Packard XP256 or EMC Symmetrix system. Conversely, Dell PowerVault storage could be connected to Compaq ProLiant servers or any Reduced Instruction Set

PROFILE: CONVERGENET

Headquarters:	San Jose
Founded:	November 1997
Product:	Universal storage connection device
Executive:	Dick Watts, president and CEO
Ship date:	October 1999
Funding:	Lucent Venture Partners, Citicorp, Sierra Ventures Partners and others
Web address:	www.convergenet.com

Computing-based server.

The Convergenet product, which Dell will launch sometime next year, also lets IT professionals dynamically allocate storage in the event of a

storage subsystem failure. Data being stored on a Windows NT storage device by a Windows NT server will be automatically directed to alternate storage if the primary storage fails.

Although neither company would comment on specifics, Convergenet's storage domain product, code-named Gemini, will initially be Fibre Channel-based with provisions for blending in legacy SCSI devices, according to Dick Watts, Convergenet's president and CEO. The deal does not preclude future iterations of the hardware connecting directly to Gigabit Ethernet or ATM links, company officials say.

"The acquisition allows Dell to get into a broader Windows NT and Unix mar-

ket," says Dave Hill, an analyst with Aberdeen Group in Boston. "The company is now a player in the overall enterprise marketplace."

Mike Lambert, senior vice president of the enterprise systems group at Dell, says the company intends to target a wide variety of storage customers eventually but needs to proceed in measured steps.

"We have been very cautious in coaching our sales people not to go head-to-head with EMC and not to overcommit on products," Lambert says. "In time, our products will encompass the total storage needs of the customer, and in the long term, absolutely [we will compete with EMC]. In the short term, absolutely not." ■

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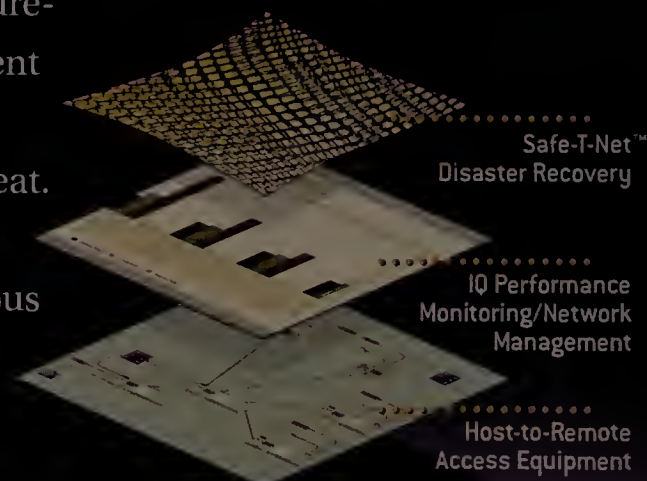
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Briefs

Novell last week reported that GroupWise 5.2 and 5.5, the latest versions of its collaborative messaging package, have Year 2000 incompatibilities. GroupWise 5.5 WebAccess, which lets users schedule meetings, listen to voice mail, receive documents or send e-mail, was unable to deal with the date Feb. 29, 2000.

GroupWise 5.2 would not print appointments or tasks beyond 2000. To fix these incompatibilities, users can download GroupWise 5.5 Support Pack 2 or GroupWise 5 Print Pack 1 from www.novell.com/year2000/patches.html. Customers can also find and fix Y2K problems with a utility from Novell. The company has a tool called Ferret, which IT managers can download from www.novell.com/year2000/y2kferret.html. Ferret runs from a Windows 95, 98 or NT workstation, scans the network and prints a report. The report indicates the version of a product, whether there are Y2K updates available for it and where patches can be downloaded from www.novell.com.

Host connectivity vendor Attachmate has rolled out a turnkey service and software package that promises to ease handheld device access to host resources. Called PalmFrame, the package works with any wireless or Internet service to let mobile users with PalmPilot and Window CE devices access and enter data to a host. The package includes Attachmate's e-Vantage HostPublishing System and AvantGo's Server and Client software. eVantage converts host data from a mainframe, AS/400 or Unix server — into HTML. That data is molded by the AvantGo software into handheld screen format. PalmFrame will be available this week for \$50,000 plus \$200 per client.

Attachmate: www.attachmate.com

IN-SITE: *Lessons from Leading Users*

VPN spells big savings for CompuCom

BY TIM GREENE

CompuCom wanted to shift 3,500 workers from branch offices to home offices, but it needed a way to control higher remote access costs, particularly a dramatic jump in 800-number dial-up bills.

The answer: adopt a virtual private network (VPN) instead of expanding its direct-dial network. The move netted the workstation reseller a savings of \$30,000 per month.

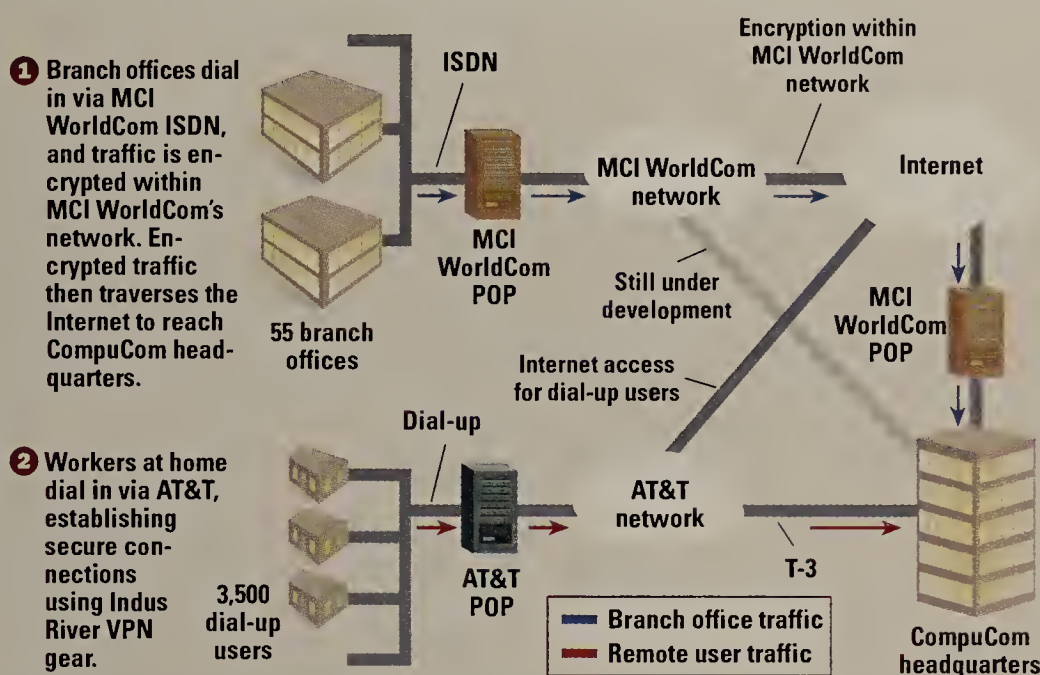
Additional savings associated with the telecommuter VPN program brought the company \$1.5 million overall savings in the first year, says Wayne Browning, CompuCom's principal network engineer.

The main reason? The VPN eliminates most direct-dial access charges. Instead, remote workers dial a local phone number to an ISP and use the Internet to make the long-haul connection. Traffic between the remote client and headquarters is secured over the 'Net by an encrypted IP tunnel set up by Indus River VPN gear.

The company is also getting rid of

Virtually everyone's connected

CompuCom has sent its employees home to work and now connects them and small branch offices to company headquarters via a virtual private network.



128K bit/sec or T-1 frame relay links between 55 corporate sites and headquarters, replacing them with VPN connections. In addition, CompuCom saves money by paying less in rent because it

leases smaller offices now that fewer workers need desk space.

When CompuCom employees were shifted to home offices, the move put a See **In-Site**, page 28

Cisco, 3Com bolster LAN switch performance, lower costs

BY JIM DUFFY

Two leading LAN switch vendors have unveiled new products designed to let users support voice on data nets and lower the cost of Ethernet switching at the network edge.

Cisco has unveiled enhancements to its Catalyst 6000 switch that add more intelligence to the device for wiring closet and backbone multilayer switching services. Cisco also rolled out a high-speed ATM uplink for the switch.

Rival 3Com recently announced a new stackable wiring closet switch that costs less than \$80 per port. Previous offerings cost about \$100 per port. 3Com also took the wraps off a switch fabric module for its seven-slot 18G bit/sec CoreBuilder 9000 chassis that's designed to cost-effectively grow wiring

closet switching.

The additions to Cisco's Catalyst 6000 switch include daughtercards for policy network and multilayer switching, and the ATM uplink. For policy networking, Cisco rolled out the Policy Feature Card (PFC), which identifies applications — such as voice, enterprise resource planning or multicast — and classifies traffic with the appropriate priority level, Cisco says.

In addition to packet classification, the PFC supports other quality-of-service features, such as packet marking, scheduling and congestion avoidance. The card also performs protocol filtering, which enables broadcast control among other features.

For multilayer switching, Cisco unveiled the Multilayer Switching Feature Card (MSFC). When used in

combination with the PFC, the MSFC provides 15 million packet/sec of forwarding performance for IP, IPX and IP Multicast traffic, in addition to supporting multiprotocol routing for AppleTalk, DecNet and VINES, Cisco says.

The MSFC also supports a suite of routing protocols, including Routing Information Protocol-I and II, Open Shortest Path First and IGRP. Access control lists are also supported for system security.

"This further extends the features of the Catalyst 6000 and brings some Layer 3 capabilities to it," says Michael Speyer, an analyst at The Yankee Group in Boston. "It's not Layer 3 forwarding on every port, but is that needed? No. You do forwarding on the uplinks where you need it."

See **Switches**, page 28

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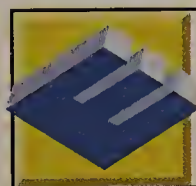
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HP targets small, midsize users with ProCurve switches

BY DENI CONNOR

PALO ALTO — Small to midsize

users looking to add a little punch to their local or campus networks may want to take a look at two new high-

performance Ethernet switches from Hewlett-Packard.

The company last week introduced

two eight-port ProCurve switches: Routing Switch 6308M-SX and ProCurve Switch 6208M-SX.

Building backbones

HP says the 6308M-SX routing switch is a low-cost way to build wire-speed, gigabit-based backbones with the same feature set as those of larger routing switches.

The 6208M-SX is aimed at customers who need wire-speed gigabit capabilities but no routing support.

The 6308M-SX includes port aggregation and switch-failover capability. Aggregation lets several ports be combined into a single logical port to support additional bandwidth.



HP's 6208M-SX switch lets users aggregate ports for increased bandwidth.

In switch failover, if one port fails, another will take over for it and traffic will be routed through the active port.

The 6208M-SX operates as a Layer 2 switch and provides the same wire-speed gigabit port aggregation feature as the 6308M-SX.

Both switches deliver 12 million packet/sec wire-speed performance and 32G bit/sec aggregate switching capacity for high-performance throughput.

The new switches fill out HP's ProCurve family of low-cost net gear. The devices should also help the company more effectively compete with Intel and others who have their sites set on the low-end market.

At least one user gives the boxes high marks for saving bandwidth.

Saving bandwidth

"As our infrastructure and the number of servers grows, we are using too much of our large core switch's bandwidth with nonessential traffic.

"We will be able to place the ProCurve 6308M-SX between this high-end switch and our smaller HP 8000 switch and off-load traffic, so the larger switch would be able to support more higher-speed traffic," says Charles Cortesi, a senior vice president at Wood Logan Associates, a financial services company in Greenwich, Conn.

The HP ProCurve Routing Switch 6308M-SX costs \$19,249.

The 6208M-SX switch will sell for \$14,249.

Both boxes will be available in October.

HP: www.hp.com

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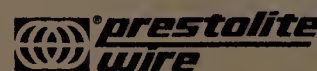
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In-Site,
continued from page 21

strain on the company's Cisco AS5300 series direct-dial servers, Browning says. To handle the extra demand, CompuCom had to boost the number of modems at corporate headquarters from 100 to 500. "The 800-number bills shot up 200% to 300%," he says.

Browning investigated using VPNs as a less expensive remote access method. Microsoft was an attractive possibility because its Point-to-Point Tunneling Protocol (PPTP) VPN enabling software is standard on Windows 95 and 98, and is supported by Windows NT Server. By going the Microsoft route, CompuCom wouldn't have to distribute separate VPN clients.

But Browning felt PPTP was not secure enough. Also, one NT server at headquarters supports only 250 users, which would have meant adding servers. "Administering what users got into what servers would have been too much," he says.

Also, CompuCom wanted to base its VPN on IP Security, the authentication and encryption standard for VPNs,

rather than PPTP. It also wanted support for IP and IPX, as well as thousands of simultaneous tunnels, without hurting throughput.

Browning tested Indus River equipment as well as equipment from another vendor Browning says he is not at liberty to name.

Browning chose Indus River because its gear met the security requirements and was simpler for remote users. "What we were trying to look for is something that would, with a single click, do everything," he says.

Indus River's client software, called River Pilot, can be configured to grant access to remote users with a single mouse click and password.

The other vendor's products would establish a VPN tunnel only after a separate program set up an ISP connection. Remote users would have been forced to log on to the ISP, then log on to the VPN.

In addition, River Pilot can be installed by end users, lifting that chore from CompuCom's IS staff, Browning says. The success rate without calling the help desk is between 85% and 95%, he says.

Indus River also generates reports on how long users are connected to the VPN, the ISP from which they connected, the operating system on the client and other data that can be used for troubleshooting, Browning says.

One drawback to the Indus River gear is that it cannot support VPN links between multiple users at remote offices and CompuCom's headquarters. Indus River equipment only connects individual remote users with central sites.

Part of CompuCom's VPN strategy was to remove frame relay links between remote offices and headquarters and replace them with the VPN. To do that CompuCom uses a VPN service provided by MCI WorldCom, which was chosen because it offers local ISDN access at 128K bit/sec.

Using MCI WorldCom's service also

gives CompuCom a backup to its primary ISP, AT&T. AT&T's service keeps CompuCom's traffic on AT&T's network, keeping it off the public Internet, and thereby avoiding unpredictable delays.

"[Our traffic] doesn't hop around the Internet to find its way back to headquarters. That definitely helps performance on the remote end," Browning says.

The key to implementing a VPN, Browning says, is planning and preparing end users for the change.

Once end users get used to the idea of dial-up speed vs. frame relay speed, they adapt well to the VPN, he says. But it is important to keep access to the VPN simple.

"You need to keep end users and the experience they will have in mind," Browning says. ■

Switches,
continued from page 21

The PFC and MSFC are optimized for intelligent server switching and Web-caching applications, Cisco says.

sity edge or backbone switch.

That higher density switch could be the CoreBuilder 9000 with the 18G bit/sec switch matrix. This module includes three Gigabit Ethernet ports to provide connectivity to workgroup servers and the network core.

3Com claims its new offerings provide users with high-performance 10/100 edge switching at prices 20% to 50% less than those of competitive offerings. A CoreBuilder 9000 seven-slot chassis with the 18G bit/sec fabric can be configured with up to 216 10/100 ports at a list price of \$286 per port; and two 3300 XMs provide 48 10/100 ports at a list price of \$82 per port.

A SuperStack II 3300 and 3300 XM switch configuration stacked via the matrix port provides up to 96 ports of connectivity and a 1000Base-SX Gigabit Ethernet downlink with a list price of \$127 per port.

The 3300 XM is priced at \$1,895 and is available now. The 18G bit/sec switch fabric for the CoreBuilder 9000 is priced at \$6,495 and will be available in October.

Cisco: www.cisco.com; 3Com: www.3com.com

Switch pitch

New from Cisco for the Catalyst 6000:

- Policy Feature Card
- Multilayer Switching Feature Card
- ATM OC-12 LAN Emulation/Multi-Protocol over ATM uplink module

New from 3Com:

- 3300XM switch for SuperStack II line
- 18G bit/sec switch fabric for CoreBuilder 9000

The two ATM uplink modules each sport two 622M bit/sec OC-12 ports in multimode or singlemode fiber. They provide Layer 2 LAN Emulation or Layer 3 Multi-Protocol-over-ATM switching services for mixed-media backbones requiring frame and ATM-based connectivity.

The MSFC and PFC are available now for \$29,995. The OC-12 uplinks start at \$21,995.

For increased performance at the network edge, 3Com announced the SuperStack II 3300XM switch and the new switching fabric for the CoreBuilder 9000. The SuperStack II 3300XM uses a matrix stacking connection to share high-speed downlinks with other members of the SuperStack II 3300 line, including 100Base-FX, 1000Base-SX, 1000Base-LX and OC-3/OC-12 ATM.

Each 3300XM supports 24 10/100M bit/sec Ethernet ports and a matrix port for stacking. Two 3300XMs can be stacked for 48 10/100 workgroup ports. This package can be added to a stack of two SuperStack II 3300s to gain 96 10/100 ports with downlinks to a higher den-

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More information about Cisco's Catalyst 6000 switches.

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A man in a dark suit and white shirt is seen from the side, looking through a large telescope. He is holding a clipboard with papers. The background is a dark, high-angle view of a city skyline at night, with many skyscrapers and lights visible. The sky is dark with some clouds.

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VPN gear from VPNet can handle session failures

Company's VSU 1200 devices can work in tandem to offer session failover and help keep VPNs running smoothly.

BY TIM GREENE



SAN JOSE — In response to customer demand for reliability, VPNet Technologies is

making its virtual private network (VPN) gear more resistant to failure.

The company at Net-World+Interop '99 Atlanta this week is introducing VSU 1200, a VPN tunnel server that has the ability to take over for another VSU 1200 if it fails.

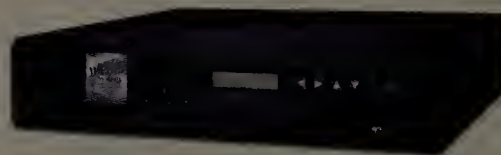
That characteristic is important to network professionals who have set up corporate VPNs that must meet

internal service-level agreements, says Jeff Wilson, an analyst with Infonetics Research in San Jose. Because VPN technology is developing rapidly, users may be wary of failures, he says.

To ease those fears, VPNet's VSU 1200s can work in tandem. Two or more VSU 1200 boxes can be tied together via 12M bit/sec cluster ports to send encrypted data between the devices. They share information about which remote users have established encrypted sessions over the Internet, as well as data on the encryption keys they are using.

The ability to share session data lets one VSU 1200 step in for another without

dropping sessions, the company claims. Each device handles up to 7,500 simultaneous VPN sessions and supports 100M bit/sec throughput.



Features of VPNet's VSU 1200 let users set up redundant VPN sessions.

Each VSU 1200 also has four Ethernet ports that enable redundant VPN configurations. For instance, two Ethernet ports can be used as redundant connections to a single router or as single con-

nections to separate routers that feed separate Internet connections. The other two could be used as redundant links to a LAN, VPNet says.

The Ethernet ports let customers build fully meshed environments in which routers, VPN gear and Internet links can back each other up, Wilson says.

The VSU 1200 has dual IP Security engines, which include the hardware and software that authenticates users and encrypts data. The device also features dual flash memory images and redundant power supplies.

The box differs from the

previous high-end VSU 1100 because it has a processing upgrade from 233-MHz to 366-MHz and a memory upgrade from 640M bytes to 728M bytes.

Wilson notes that VSU 1200 lacks a firewall, load sharing and bandwidth management, which are features important to securing VPNs and boosting their efficiency. He says he expects the company to address these areas in future software releases.

VSU 1200 will be available next month and costs \$30,000 plus management software and client licenses. The price range for client licenses is \$20 to \$90, depending on how many you buy.

VPNet: www.vpnet.com

VOICE

DATA

VIDEO

Information is

TapeLabs unveils tape sharing device

TapeServer backups multiple, heterogeneous hosts via SCSI or Fibre Channel connections.

BY DENI CONNOR

At NetWorld+Interop '99 Atlanta this week, TapeLabs will be rolling out a device that lets customers share tape backup devices among a variety of operating systems and servers.

The company's TapeServer box links most servers including Microsoft's Windows NT, Unix or Novell NetWare in midsize-to-large environments with most tape libraries and tape backup systems. TapeServer does not require any operating system or application software changes, and works with backup application software from many vendors, including Computer Associates, Veritas and Legato.

TapeServer sits between the server and the tape library. The box communicates via a Fibre Channel or SCSI connection to the server and tape devices.

Allows load balancing

TapeServer lets users partition storage space so a single tape library can be shared by a number of host devices. Multiple tape subsystems can be connected to the TapeServer as well, and the product will allow load balancing between the devices. In the event that one tape unit fails, another can dynamically take over. Tapes may also be mirrored within the same

tape library or separate libraries for fault-tolerance.

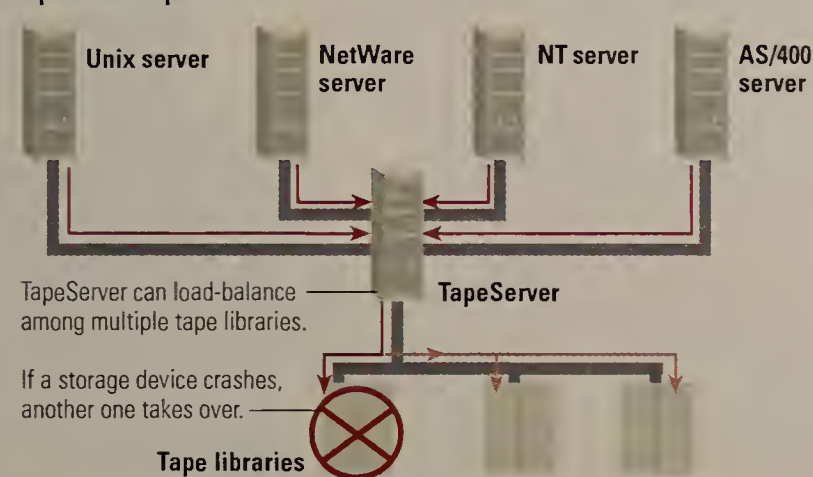
"The advantage of Tape-

Server is that it does not preclude the use of SCSI devices.

Users don't automatically

Backup deluxe

Multiple servers can connect to myriad of backup tape devices via TapeLabs' TapeServer.



need to upgrade to Fibre Channel devices as they would need to with a storage-area network," says Dave Hill, an analyst with Aberdeen Group in Boston.

Blending servers

Most companies have a mix of SCSI- and Fibre Channel-equipped servers and tape units distributed across their networks, Hill says. TapeServer lets them quickly blend all the servers and storage devices into a single backup system.

TapeServer is available in several configurations. The largest unit has 14 data channels. Each channel can accommodate up to 15 SCSI or 124 Fibre Channel devices. Tape Labs' smallest switch, pricing for which starts at \$15,000, has two host channels and two device channels.

TapeLabs: www.tapelabs.com

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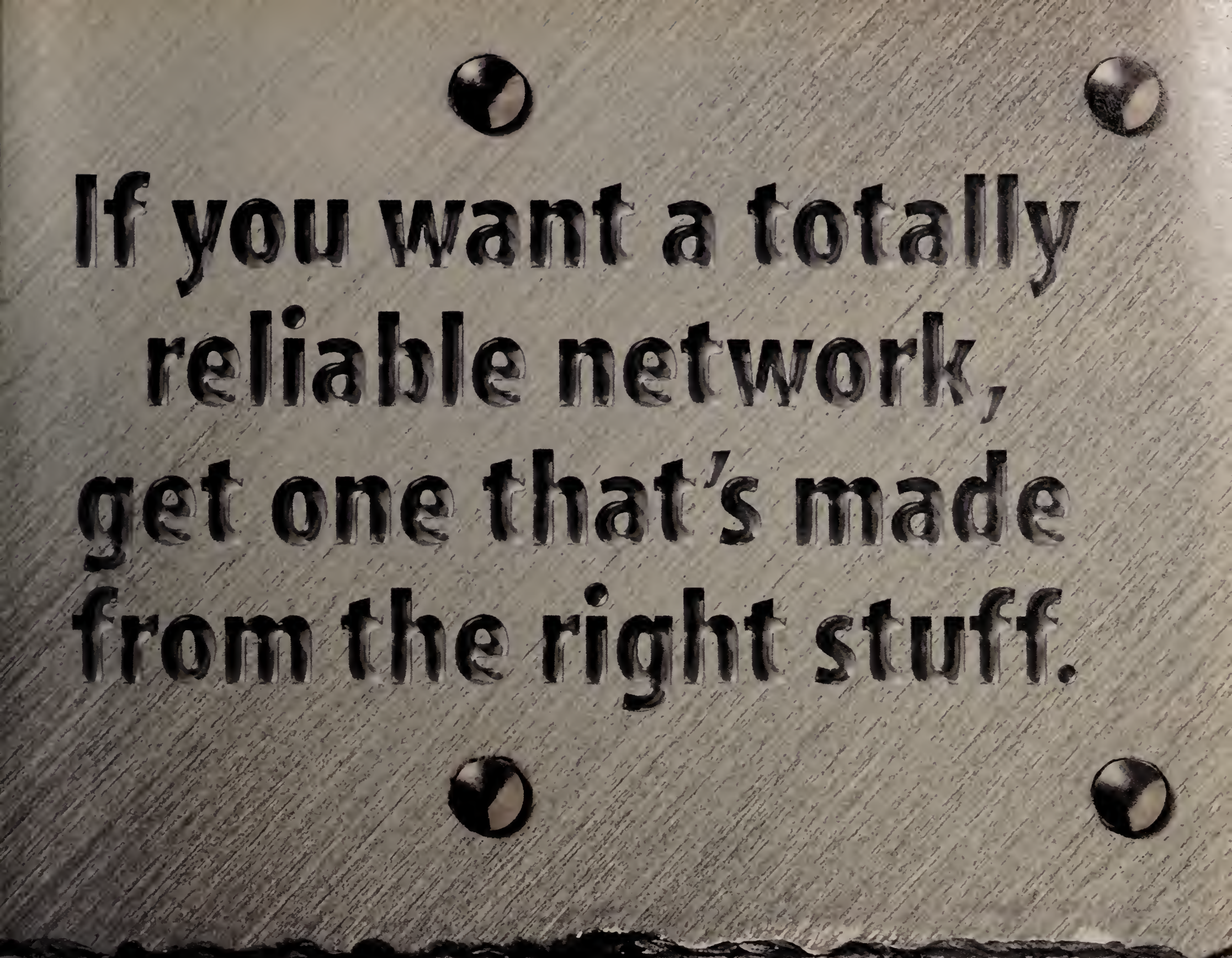
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NTP software controls printing, disk use for NT clients

BY JOHN FONTANA

MANCHESTER, N.H. — With network resources at a premium, large

users that want to keep their network disk space and print jobs on a quota system may get some relief from NTP Software.

The company this month is taking the wraps off two products. First, Print Quota Manager is expected to be released this week at NetWorld+Interop '99 Atlanta. It

lets network administrators set limits on the amount of printing that can be done by individual users or groups of users. Then later this month, NTP will announce Version 5.0 of its Quota Manager product, which manages disk space for users or groups. The software features integration with Computer Associates' Unicenter management platform.

Both NTP products provide server-based controls over resources that typically are consumed according to user discretion.

"Students have a field day with my printers," says Steven Black, network support specialist for the Pennsylvania State University. "Print Quota Manager can help me control my printing costs." Black already runs NTP's Quota Manager to control access to the disk space on a RAID 5 server attached to his network. "The beauty of Quota Manager products is that I can point and click, and have my controls set. I can single out users if need be or set limits by groups," he says. Black assigns his student users 50M bytes of disk space but can change that instantly by changing quotas in an administrative console.

Print Quota Manager employs the same types of controls for printer resources. Limits can be set for the number of pages printed in a given time period. Those limits can apply to single users or a group of users, or can restrict the number of pages for any single print job. The software can also limit the types of files that can be printed and can send e-mail notifications to alert users about restrictions.

The software runs on Windows NT servers and supports any client that can connect to the server.

NTP is updating Quota Manager with templates for assigning quota enforcement policies; the ability to set quotas on logical or compressed volumes in NT; and the ability to manage groups of servers as a logical whole. NTP is also adding reporting tools. Microsoft's Windows 2000 has a similar disk management feature, and NTP hopes to build off Windows 2000's capabilities.

"In large installations of Windows 2000, you'll need the ability to manage large numbers of quotas. That's where we pick up and Windows 2000 lets off," says Mark Leff, vice president of business development at NTP.

Quota Manager and Print Quota Manager are compatible with the forthcoming Windows 2000 and are integrated with Microsoft's Management Console.

Print Quota Manager is priced at \$395 per server and will ship at the end of this month. Quota Manager 5.0 costs \$1,090 per server and will ship later this year.

NTP: www.ntpsoftware.com

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Wired Windows . Dave Kearns

IT'S SHOW TIME AT INTEROP

If you're at NetWorld+Interop '99 Atlanta this week, I'd like to point out three free events that could be very interesting.

First, of course, is our honcho John Gallant's Convergence Showdown scheduled for Tuesday at 12:30 p.m. in Ballroom 1 of the World Congress

Center. If you (like me) wonder what all the noise is about, this panel should go a long way toward culling the hype from the hope.

Then on Wednesday at 11 a.m., you'll want to be in the audience when Network World Fusion Managing Editor Sandra Gittlen gathers a panel of

Network World columnists for a debate about the future of networking. The fur should fly as each columnist stakes out a vision for the future while the others try to keep that vision fixed on reality.

Lastly, Tuesday's Birds of a Feather session (at 6 p.m. in Room 235 west in the World Congress Center), called "The DEN-CIM Connection: A Road Map of Directory Enabled Networks," will give you a chance to hear from the leaders of the Distributed Management Task Force (DMTF) just where DEN is headed. And DEN is headed for the big time.

Just recently, the *Forbes* magazine empire (in *Forbes*' ASAP) said of the DMTF, "... when the group publishes its next set of DEN standards by early next year, the way consumers and businesses use the Internet will be changed forever." Now this is in a magazine that your board of directors reads. And they'll tell your CEO, he'll tell the chief information officer and pretty soon someone will tell your boss who'll pass on to you the order to start rolling out that DEN stuff. So you better know what its all about.

The first real products based on current DEN specifications are coming. Cisco's User Registration Tool (URT Version 1.2) is firmly attached to your directory service, whether it's Microsoft's Active Directory or Novell Directory Services (NDS). It's a neat product that maps users in Windows NT domains or NDS to a dynamically assigned virtual LAN. The VLAN assignments are tied directly to the users instead of being associated with something physical, such as a switch port or a network card address. So users can log on to any machine on the network and still access the proper VLAN and network resources.

Cisco's URT is only useful if you're also using the company's switches and routers, but watch for multivendor interoperability within the next six months as DEN takes hold in other companies.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

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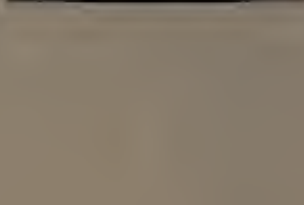
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Tip of The Week



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1. What is the principal business activity at your location?

(check ONE only)

- | | | |
|---|--|---|
| 01. <input type="checkbox"/> Manufacturing (other) | 10. <input type="checkbox"/> Education | 19. <input type="checkbox"/> Systems/Network Integrators* |
| 02. <input type="checkbox"/> Finance/Banking | 11. <input type="checkbox"/> Government | 20. <input type="checkbox"/> Distributors (Computer/Communications)* |
| 03. <input type="checkbox"/> Insurance/Real Estate/Legal | 12. <input type="checkbox"/> Military | 21. <input type="checkbox"/> Other (please specify) _____ |
| 04. <input type="checkbox"/> Health Care Services | 13. <input type="checkbox"/> Aerospace | |
| 05. <input type="checkbox"/> Hospitality/Entertainment/Recreation | 14. <input type="checkbox"/> Consulting (Independent) * | |
| 06. <input type="checkbox"/> Media/TV/Cable/Radio/Print | 15. <input type="checkbox"/> Carriers/Service Providers | |
| 07. <input type="checkbox"/> Retail/Wholesale Trade/Business Services | 16. <input type="checkbox"/> Internet Service Provider (ISP) | *Attn Consultants, Integrators, Distributors, Resellers: Please complete entire form based on ALL clients and your own business needs |
| 08. <input type="checkbox"/> Transportation | 17. <input type="checkbox"/> Manufacturing (Computer/Communications/OEM) | |
| 09. <input type="checkbox"/> Utilities/Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry) | 18. <input type="checkbox"/> Resellers of Computer/Network Products (VARs,VADs)* | |

2. P: What is your primary job function? (check ONE only)

S: What is your secondary job function? (check ALL that apply)

- | | | | | | |
|--|--|---|----------|--|----------|
| P | S | P | S | P | S |
| 1. <input type="checkbox"/> Network Management | 5. <input type="checkbox"/> Internet/Intranet/E-Commerce Mgmt, Webmaster | 7. <input type="checkbox"/> Corporate Management (CEO, COO, CFO, Pres., VP, Dir., Mgr.) | | 8. <input type="checkbox"/> Consultant (Independent) | |
| 2. <input type="checkbox"/> LAN Management | 6. <input type="checkbox"/> Engineering Management | 9. <input type="checkbox"/> Other (please specify) _____ | | | |
| 3. <input type="checkbox"/> Datacom/Telecom Management | | | | | |
| 4. <input type="checkbox"/> IS/IT/MIS/CIO/CTO/Systems Management | | | | | |

3. What is the estimated value of Network equipment and services that you specify, recommend or approve the purchase of? (Please print the appropriate number code on the line next to each product category. Please complete ALL categories A-M.)

- | | | |
|-----------------------------------|---|---|
| 1. \$100 Million or more | A _____ Large Systems (Mainframes/Minis) | G _____ Internetworking |
| 2. \$50 Million to \$99.9 Million | | H _____ Internet |
| 3. \$25 Million to \$49.9 Million | B _____ Desktops (Micros/Laptops/Workstations/PDAs) | I _____ Intranet E-Commerce |
| 4. \$10 Million to \$24.9 Million | | J _____ Extranet/Ecommerce |
| 5. \$1 Million to \$9.9 Million | C _____ Servers | K _____ Remote Access |
| 6. \$100,000 to \$999,999 | D _____ LANs | L _____ Peripherals (including storage) |
| 7. \$50,000 to \$99,999 | E _____ WAN Equipment | M _____ Software |
| 8. Under \$50,000 | F _____ Carrier Services | N _____ Service/Support |
| 9. None of the above | | |

4. What is the total number of sites for which you have purchase influence?

(check ONE only)

1. ☐ 100+ 2. ☐ 50 - 99 3. ☐ 20 - 49 4. ☐ 10 - 19 5. ☐ 2 - 9 6. ☐ 1 7. ☐ None

5. What is the total number of Servers/Clients/LANs installed/planned at your location/ in your entire organization? (check ONE box in each column)

SERVERS		CLIENTS		LANs	
At Location	Entire Org.	At Location	Entire Org.	At Location	Entire Org.
A	B	C	D	E	F
<input type="checkbox"/> 1. 50,000+	<input type="checkbox"/>	<input type="checkbox"/> 1. 50,000+	<input type="checkbox"/>	<input type="checkbox"/> 1. 50,000+	<input type="checkbox"/>
<input type="checkbox"/> 2. 10,000 to 49,999	<input type="checkbox"/>	<input type="checkbox"/> 2. 10,000 to 49,999	<input type="checkbox"/>	<input type="checkbox"/> 2. 10,000 to 49,999	<input type="checkbox"/>
<input type="checkbox"/> 3. 1,000 to 9,999	<input type="checkbox"/>	<input type="checkbox"/> 3. 1,000 to 9,999	<input type="checkbox"/>	<input type="checkbox"/> 3. 1,000 to 9,999	<input type="checkbox"/>
<input type="checkbox"/> 4. 100 to 999	<input type="checkbox"/>	<input type="checkbox"/> 4. 100 to 999	<input type="checkbox"/>	<input type="checkbox"/> 4. 100 to 999	<input type="checkbox"/>
<input type="checkbox"/> 5. 50 to 99	<input type="checkbox"/>	<input type="checkbox"/> 5. 50 to 99	<input type="checkbox"/>	<input type="checkbox"/> 5. 50 to 99	<input type="checkbox"/>
<input type="checkbox"/> 6. 10 to 49	<input type="checkbox"/>	<input type="checkbox"/> 6. 10 to 49	<input type="checkbox"/>	<input type="checkbox"/> 6. 10 to 49	<input type="checkbox"/>
<input type="checkbox"/> 7. 1 to 9	<input type="checkbox"/>	<input type="checkbox"/> 7. 1 to 9	<input type="checkbox"/>	<input type="checkbox"/> 7. 1 to 9	<input type="checkbox"/>
<input type="checkbox"/> 8. none	<input type="checkbox"/>	<input type="checkbox"/> 8. none	<input type="checkbox"/>	<input type="checkbox"/> 8. none	<input type="checkbox"/>

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check ONE only)

- CORPORATE:
1. ☐ Entire Enterprise/Multiple Enterprises
2. ☐ Division/Multiple Divisions
3. ☐ Department
4. ☐ None

B. Involvement (check ALL that apply)

1. ☐ Create Network/IT Strategy
2. ☐ Recommend/Specify Brand
3. ☐ Approve Purchase
4. ☐ Evaluate Products/Services
5. ☐ Determine the Need
6. ☐ None

7. What is the estimated number of employees at your location/in entire organization? (check ONE in each section)

- | | | | |
|---|--|---|---|
| A. At your location: | | B. Entire organization: | |
| 1. <input type="checkbox"/> Over 20,000 | 6. <input type="checkbox"/> 500 - 999 | 1. <input type="checkbox"/> Over 20,000 | 5. <input type="checkbox"/> 1,000 - 2,499 |
| 2. <input type="checkbox"/> 10,000 - 19,999 | 7. <input type="checkbox"/> 250 - 499 | 2. <input type="checkbox"/> 10,000 - 19,999 | 6. <input type="checkbox"/> 500 - 999 |
| 3. <input type="checkbox"/> 5,000 - 9,999 | 8. <input type="checkbox"/> 100 - 249 | 3. <input type="checkbox"/> 5,000 - 9,999 | 7. <input type="checkbox"/> 499 or less |
| 4. <input type="checkbox"/> 2,500 - 4,999 | 9. <input type="checkbox"/> 99 or less | 4. <input type="checkbox"/> 2,500 - 4,999 | |
| 5. <input type="checkbox"/> 1,000 - 2,499 | | | |

8.

Please indicate the Internet/Intranet/LAN/WAN products/services that you are currently involved in purchasing or plan to purchase (check ALL that apply)

A. Currently involved in purchasing

B. Plan to purchase

INTERNET/INTRANET

- | | | | | | |
|---|--|---|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 01. <input type="checkbox"/> VPN Equipment | <input type="checkbox"/> 07. <input type="checkbox"/> Voice/Video Over IP (IP Multicast Routing) | <input type="checkbox"/> 12. <input type="checkbox"/> Management/Monitoring Software | | | |
| <input type="checkbox"/> 02. <input type="checkbox"/> VPN Services | <input type="checkbox"/> 08. <input type="checkbox"/> Internet Services | <input type="checkbox"/> 13. <input type="checkbox"/> Web Based Management Tools | | | |
| <input type="checkbox"/> 03. <input type="checkbox"/> Firewalls/Security/Encryption | <input type="checkbox"/> 09. <input type="checkbox"/> Web Hosting | <input type="checkbox"/> 14. <input type="checkbox"/> Web Based Collaboration/Groupware | | | |
| <input type="checkbox"/> 04. <input type="checkbox"/> Electronic Commerce | <input type="checkbox"/> 10. <input type="checkbox"/> Host Access | <input type="checkbox"/> 15. <input type="checkbox"/> Caching/Load Balancing Products | | | |
| <input type="checkbox"/> 05. <input type="checkbox"/> Web Servers/Software | <input type="checkbox"/> 11. <input type="checkbox"/> Web Development Tools | <input type="checkbox"/> 16. <input type="checkbox"/> Other Internet/Intranet | | | |
| <input type="checkbox"/> 06. <input type="checkbox"/> Web Enabled Call Center Tools | | | | | |

LOCAL-AREA NETWORKS/INTERNETWORKING

- | | | | | | |
|---|--|--|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 17. <input type="checkbox"/> Local-Area Networks | <input type="checkbox"/> 25. <input type="checkbox"/> Layer 2 Switches | <input type="checkbox"/> 33. <input type="checkbox"/> UPS | | | |
| <input type="checkbox"/> 18. <input type="checkbox"/> Network Operating System Software (NOS) | <input type="checkbox"/> 26. <input type="checkbox"/> Layer 3 Switches | <input type="checkbox"/> 34. <input type="checkbox"/> Network Interface Cards (NICs, PCMCIA) | | | |
| <input type="checkbox"/> 19. <input type="checkbox"/> Intel Based Servers | <input type="checkbox"/> 27. <input type="checkbox"/> Layer 4 Switches | <input type="checkbox"/> 35. <input type="checkbox"/> Hubs/Intelligent Hubs/Stackable Hubs | | | |
| <input type="checkbox"/> 20. <input type="checkbox"/> Intel Based Multiprocessor Servers | <input type="checkbox"/> 28. <input type="checkbox"/> ATM Switches | <input type="checkbox"/> 36. <input type="checkbox"/> Cables, Connectors, Baluns | | | |
| <input type="checkbox"/> 21. <input type="checkbox"/> RISC Based Servers | <input type="checkbox"/> 29. <input type="checkbox"/> Token-Ring Switches | <input type="checkbox"/> 37. <input type="checkbox"/> SNMP Platform | | | |
| <input type="checkbox"/> 22. <input type="checkbox"/> Clustered Servers | <input type="checkbox"/> 30. <input type="checkbox"/> Network Storage (NAS, SANs) | <input type="checkbox"/> 38. <input type="checkbox"/> Management Frameworks | | | |
| <input type="checkbox"/> 23. <input type="checkbox"/> Print Servers | <input type="checkbox"/> 31. <input type="checkbox"/> Storage/Backup (Optical, Disk, Tape, RAID) | <input type="checkbox"/> 39. <input type="checkbox"/> Other LAN/Internetworking | | | |
| <input type="checkbox"/> 24. <input type="checkbox"/> Routers | <input type="checkbox"/> 32. <input type="checkbox"/> Network Test/Diagnostic Tools | | | | |

WAN EQUIPMENT & SERVICES

- | | | | | | |
|---|--|--|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 40. <input type="checkbox"/> Modems | <input type="checkbox"/> 46. <input type="checkbox"/> Remote Access Services | <input type="checkbox"/> 53. <input type="checkbox"/> PBXs | | | |
| <input type="checkbox"/> 41. <input type="checkbox"/> Cable Modems | <input type="checkbox"/> 47. <input type="checkbox"/> Wireless Data Equipment/Services | <input type="checkbox"/> 54. <input type="checkbox"/> Videoconferencing | | | |
| <input type="checkbox"/> 42. <input type="checkbox"/> Asynchronous Transfer Mode (ATM) | <input type="checkbox"/> 48. <input type="checkbox"/> ISDN Equipment/Services | <input type="checkbox"/> 55. <input type="checkbox"/> Managed LAN/Router Services | | | |
| <input type="checkbox"/> 43. <input type="checkbox"/> Frame Relay Equipment Including FRADS | <input type="checkbox"/> 49. <input type="checkbox"/> FT-1/T-1/T-3 Services | <input type="checkbox"/> 56. <input type="checkbox"/> Fax Servers/Services | | | |
| <input type="checkbox"/> 44. <input type="checkbox"/> Frame Relay Services | <input type="checkbox"/> 50. <input type="checkbox"/> xDSL Services/Products | <input type="checkbox"/> 57. <input type="checkbox"/> Other WAN Equipment/Services | | | |
| <input type="checkbox"/> 45. <input type="checkbox"/> Remote Access Products | <input type="checkbox"/> 51. <input type="checkbox"/> Diagnostic/Test Equipment | | | | |
| | <input type="checkbox"/> 52. <input type="checkbox"/> DSU/CSU | None of the above (1 - 57) <input type="checkbox"/> 58. <input type="checkbox"/> | | | |

9.

Please indicate the Network hardware/software/services that you are currently involved in purchasing or plan to purchase: (check ALL that apply)

A. Currently involved in purchasing

B. Plan to purchase

COMPUTERS/PERIPHERALS

- | | | | | | |
|--|---|---|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 01. <input type="checkbox"/> Laptops/Notebooks/PDAs | <input type="checkbox"/> 05. <input type="checkbox"/> Storage/Backup (Optical, Disk, Tape, RAID) | <input type="checkbox"/> 08. <input type="checkbox"/> Minis | | | |
| <input type="checkbox"/> 02. <input type="checkbox"/> PCs | <input type="checkbox"/> 06. <input type="checkbox"/> Printers | <input type="checkbox"/> 09. <input type="checkbox"/> Mainframes | | | |
| <input type="checkbox"/> 03. <input type="checkbox"/> Windows Terminals/Thin Clients | <input type="checkbox"/> 07. <input type="checkbox"/> Printer/Fax/Copier Hybrids (Multifunction Printers) | <input type="checkbox"/> 10. <input type="checkbox"/> Fax/Modem Boards | | | |
| <input type="checkbox"/> 04. <input type="checkbox"/> Workstations | | <input type="checkbox"/> 11. <input type="checkbox"/> Memory/Chips/Boards/Cards | | | |
| | | <input type="checkbox"/> 12. <input type="checkbox"/> Other Computers/Peripherals | | | |

SOFTWARE/APPLICATIONS

- | | | | | | |
|--|--|---|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 13. <input type="checkbox"/> Network Management | <input type="checkbox"/> 21. <input type="checkbox"/> E-Mail | <input type="checkbox"/> 28. <input type="checkbox"/> Site Metering Tools | | | |
| <input type="checkbox"/> 14. <input type="checkbox"/> Systems Management | <input type="checkbox"/> 22. <input type="checkbox"/> Enterprise Resource Planning (ERP) | <input type="checkbox"/> 29. <input type="checkbox"/> Data Warehousing | | | |
| <input type="checkbox"/> 15. <input type="checkbox"/> Security | <input type="checkbox"/> 23. <input type="checkbox"/> EDI | <input type="checkbox"/> 30. <input type="checkbox"/> Anti Virus Software | | | |
| <input type="checkbox"/> 16. <input type="checkbox"/> Directory Services | <input type="checkbox"/> 24. <input type="checkbox"/> Desktop Videoconferencing | <input type="checkbox"/> 31. <input type="checkbox"/> Multimedia | | | |
| <input type="checkbox"/> 17. <input type="checkbox"/> Operating Systems | <input type="checkbox"/> 25. <input type="checkbox"/> Imaging | <input type="checkbox"/> 32. <input type="checkbox"/> Y2K Conversion Software | | | |
| <input type="checkbox"/> 18. <input type="checkbox"/> Applications Development Tools | <input type="checkbox"/> 26. <input type="checkbox"/> Middleware/Serverware | <input type="checkbox"/> 33. <input type="checkbox"/> Helpdesk | | | |
| <input type="checkbox"/> 19. <input type="checkbox"/> Database Management/RDBMS | <input type="checkbox"/> 27. <input type="checkbox"/> Document Management | <input type="checkbox"/> 34. <input type="checkbox"/> Other Software/Applications | | | |
| <input type="checkbox"/> 20. <input type="checkbox"/> Groupware | | | | | |

SERVICES

- | | | | | | |
|---|--|---|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 35. <input type="checkbox"/> BPO (Business Process Outsourcing incl. Financial Services, HR, Logistics etc.) | <input type="checkbox"/> 36. <input type="checkbox"/> Applications Outsourcing | <input type="checkbox"/> 39. <input type="checkbox"/> Education/Training Services | | | |
| | <input type="checkbox"/> 37. <input type="checkbox"/> Call Center Outsourcing | <input type="checkbox"/> 40. <input type="checkbox"/> Other Services | | | |
| | <input type="checkbox"/> 38. <input type="checkbox"/> Systems Integration/Consulting | None of the above (1 - 40) <input type="checkbox"/> 41. <input type="checkbox"/> | | | |

10.

Please indicate the platforms that are currently installed/planned: (check ALL that apply)

A. Currently installed

B. Planned for purchase

NETWORK PROTOCOLS

- | | | | | | |
|--|--|---|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 01. <input type="checkbox"/> TCP/IP | <input type="checkbox"/> 04. <input type="checkbox"/> Novell IPX/SPX | <input type="checkbox"/> 07. <input type="checkbox"/> NFS | | | |
| <input type="checkbox"/> 02. <input type="checkbox"/> IPv6 | <input type="checkbox"/> 05. <input type="checkbox"/> APPC/APPN/LU 6.2 | <input type="checkbox"/> 08. <input type="checkbox"/> SNMP | | | |
| <input type="checkbox"/> 03. <input type="checkbox"/> SNA | <input type="checkbox"/> 06. <input type="checkbox"/> NETBIOS/NETBUEI | <input type="checkbox"/> 09. <input type="checkbox"/> Other Network Protocols | | | |

LAN/WAN ENVIRONMENT

- | | | | | | |
|---|---|--|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 10. <input type="checkbox"/> Gigabit Ethernet | <input type="checkbox"/> 16. <input type="checkbox"/> IP Switching | <input type="checkbox"/> 22. <input type="checkbox"/> Wireless | | | |
| <input type="checkbox"/> 11. <input type="checkbox"/> Switched Ethernet | <input type="checkbox"/> 17. <input type="checkbox"/> Layer 3,4 Switching | <input type="checkbox"/> 23. <input type="checkbox"/> DSL | | | |
| <input type="checkbox"/> 12. <input type="checkbox"/> Fast Ethernet | <input type="checkbox"/> 18. <input type="checkbox"/> FDDI | <input type="checkbox"/> 24. <input type="checkbox"/> ISDN | | | |
| <input type="checkbox"/> 13. <input type="checkbox"/> Ethernet | <input type="checkbox"/> 19. <input type="checkbox"/> 100Base-T | <input type="checkbox"/> 25. <input type="checkbox"/> Frame Relay | | | |
| <input type="checkbox"/> 14. <input type="checkbox"/> ATM | <input type="checkbox"/> 20. <input type="checkbox"/> 10Base-T | <input type="checkbox"/> 26. <input type="checkbox"/> Private Line T1, T3, FT-1, SONET | | | |
| <input type="checkbox"/> 15. <input type="checkbox"/> Token Ring/Token Ring Switching | <input type="checkbox"/> 21. <input type="checkbox"/> Fibre Channel | <input type="checkbox"/> 27. <input type="checkbox"/> Other LAN/WAN Environment | | | |

NETWORK OPERATING SYSTEM

- | | | | | | |
|--|---|--|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 28. <input type="checkbox"/> Windows NT/Windows 2000 | <input type="checkbox"/> 32. <input type="checkbox"/> LINUX | <input type="checkbox"/> 35. <input type="checkbox"/> IBM (LAN Server) | | | |
| <input type="checkbox"/> 29. <input type="checkbox"/> Novell (NetWare 5.X) | <input type="checkbox"/> 33. <input type="checkbox"/> Microsoft (LAN Manager) | <input type="checkbox"/> 36. <input type="checkbox"/> Other Network Operating System | | | |
| <input type="checkbox"/> 30. <input type="checkbox"/> Novell (NetWare 4.X) | <input type="checkbox"/> 34. <input type="checkbox"/> Banyan (Vines) | | | | |
| <input type="checkbox"/> 31. <input type="checkbox"/> Novell (NetWare 2.X,3.X) | | | | | |

COMPUTER OPERATING SYSTEM

- | | | | | | |
|---|---|---|----------|----------|----------|
| A | B | A | B | A | B |
| <input type="checkbox"/> 37. <input type="checkbox"/> NT Workstation | <input type="checkbox"/> 42. <input type="checkbox"/> LINUX | <input type="checkbox"/> 47. <input type="checkbox"/> Digital VMS | | | |
| <input type="checkbox"/> 38. <input type="checkbox"/> Windows 2000 | <input type="checkbox"/> 43. <input type="checkbox"/> DOS | <input type="checkbox"/> 48. <input type="checkbox"/> Macintosh | | | |
| <input type="checkbox"/> 39. <input type="checkbox"/> Windows 98/95/3.1 | <input type="checkbox"/> 44. <input type="checkbox"/> OS/2, OS/2 Warp | <input type="checkbox"/> 49. <input type="checkbox"/> Other Computer Operating System | | | |
| <input type="checkbox"/> 40. <input type="checkbox"/> Intel based UNIX | <input type="checkbox"/> 45. <input type="checkbox"/> OS/400 | | | | |
| <input type="checkbox"/> 41. <input type="checkbox"/> RISC based UNIX (incl. SOLARIS) | <input type="checkbox"/> 46. <input type="checkbox"/> IBM MVS/VM/SE/ESA | None of the above (1- 49) <input type="checkbox"/> 50. <input type="checkbox"/> | | | |

11.

Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

A - Mainframes (Large Scale)

1. ☐ IBM
2. ☐ Other

B - Minis (Midrange)

1. ☐ IBM RS/6000
2. ☐ IBM AS/400
3. ☐ Digital/Tandem/Compaq
4. ☐ Unisys
5. ☐ H-P
6. ☐ Other

C - Workstations

1. ☐ Sun Microsystems
2. ☐ H-P
3. ☐ Digital/Compaq
4. ☐ IBM
5. ☐ Silicon Graphics
6. ☐ Other

12.

What is the estimated gross revenue of your entire company/institution? (check ONE only)

- | | | |
|--|--|---|
| 1. <input type="checkbox"/> \$20 Billion or More | 5. <input type="checkbox"/> \$100 Million to \$499.9 Million | 9. <input type="checkbox"/> \$4.9 Million or less |
| 2. <input type="checkbox"/> \$10 Billion to \$19.9 Billion | 6. <input type="checkbox"/> \$50 Million to \$99.9 Million | 10. <input type="checkbox"/> None of the above |
| 3. <input type="checkbox"/> \$1 Billion to \$9.9 Billion | 7. <input type="checkbox"/> \$10 Million to \$49.9 Million | |
| 4. <input type="checkbox"/> \$500 Million to \$999.9 Million | 8. <input type="checkbox"/> \$5 Million to \$9.9 Million | |

13.

For which areas outside of the US do you have purchase influence? (check ALL that apply)

- | | | | |
|------------------------------------|---|---|------------------------------------|
| 1. <input type="checkbox"/> Europe | 3. <input type="checkbox"/> South America | 5. <input type="checkbox"/> Middle East | 7. <input type="checkbox"/> Canada |
| 2. <input type="checkbox"/> Asia | 4. <input type="checkbox"/> Australia | 6. <input type="checkbox"/> Africa | 8. <input type="checkbox"/> None |

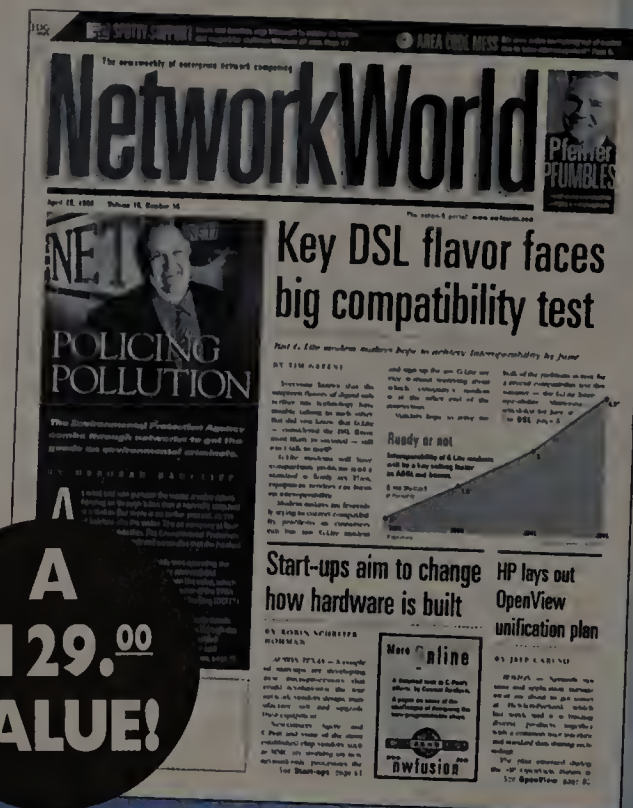
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NAME _____

FUNCTION _____

NAME _____

FUNCTION _____

NAME _____

FUNCTION _____

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Briefs

AT&T and British Telecommunications have completed their previously announced purchase of a \$1.83 billion equity stake in Japan Telecom. The two buyers each took a 15% interest in the Japanese company. Japan Telecom is the third-largest carrier in Japan, although it is dwarfed by NTT, the dominant carrier. Japan Telecom will be the sole distributor of combined AT&T/BT global services in Japan once the joint venture gains full regulatory approval.

Global Crossing is having trouble avoiding a slippery slope in its purchase of Frontier, the fifth-largest U.S. long-distance carrier. Global Crossing boosted its offer to Frontier shareholders after a Global Crossing stock slide dropped the total value of the old offer from about \$11 billion to about \$9 billion. The new offer: 2.05 shares of Global Crossing for each share of Frontier produced an offer value of about \$10 billion — until Global Crossing stock dropped another 6.5% after the revised deal was announced.

Digital Island, a network service provider in San Francisco, has announced a deal with RealNetworks and Inktomi to roll out a global streaming media service. Digital Island plans on deploying RealNetworks' RealSystem G2 servers that support audio and video stream routing, and load balancing.

Digital Island already has Inktomi's Traffic Servers deployed in its network, but the service provider is upgrading the cache servers with Inktomi's Media Cache software option that supports audio and video caching. Digital Island is expected to announce its first streaming service in October.

Digital Island: www.digitalisland.com

Exodus bringing Web content closer

ReadyCache Content Distribution Service aimed at graphic-intensive Web sites.

BY DENISE PAPPALARDO

SANTA CLARA, CALIF. — Exodus Communications is rolling out a new caching service this week that will let customers distribute their content more strategically over the Web.

A Web-hosting and collocation service provider based in Santa Clara, Exodus is installing Inktomi Traffic Servers in all Exodus data centers to support the ReadyCache Content Distribution Service around the world. Today, Exodus has 13 data centers and plans on bringing nine more online by year-end.

The ReadyCache Service lets Exodus hosting and collocation customers have parts or all of their Web content cached and stored on servers at all Exodus data centers. Distributing the content in this manner will give Web surfers from around the world faster access because

the servers they are hitting will physically be closer than if they were being hosted on a single server.



"Even though we're leasing capacity, it's our dedicated fiber."

Ellen Hancock, CEO, Exodus

The service is targeted at business users in the publishing, entertainment and software industries that have graphic-intensive Web sites or sites from which large files are often downloaded.

Ishophere.com (pronounced "I shop here") started using the ReadyCache Content Distribution Service last

month. "The closer we can bring our site to consumers, the faster the site will perform for those users," says Crom Carmichael, chief operating officer at the online shopping portal in Nashville.

Ishophere.com essentially guides online shoppers to other sites on the Internet by introducing merchandise in various categories such as woman's apparel, automotive, books or photography. But the site doesn't just provide a bunch of hyperlinks. If online shoppers click on Barnes & Noble, Dell, J.Crew

or J.C. Penney, they get an introduction to the site with a list of additional choices. Carmichael says ishophere.com's main Web server, which is stored in Exodus' Herndon, Va., data center, stores a lot of data from the company's many portal partners. The ability to cache that information at all 13 of See **Exodus**, page 41

Western CLEC offers high-speed options

BY DAVID ROHDE

VANCOUVER, WASH. — A competitive local exchange carrier concentrated in the western states is climbing up the bandwidth ladder with a set of new high-speed Internet access offerings.

GST Telecommunications has introduced three new standardized services: Clear Channel DS-1/DS-3, Ethernet/Fast Ethernet and ATM access. Each of the services is available at a speed up to 45M bit/sec.

The three services are also tiered in 3M bit/sec increments. For example, users can choose two times 3M bit/sec, or 6M of bandwidth, either placed into ATM cells or kept in native Ethernet format, for the same price (see graphic).

There are some additional requirements for the native Ethernet service, though. Depending on the speed, users may be required to collocate switches or routers in GST's central office, the

company says. As a result, the service is expected to be initially of interest more to ISPs than to enterprise customers.

But unlike some other CLECs, GST is also building its own intercity network to reach principal Internet exchange hand-off points as well as offering local loops. GST is employing gigabit core routers from Juniper Networks, as well as Cisco 7513 edge routers in local points of presence.

Expansion planned

The intercity network, called the Virtual Integrated Transport and Access network, currently runs 2,000 route-miles around the western U.S. at a speed of up to OC-48, with plans to expand to 6,600 route-miles. As part of its strategy, GST has obtained exclusive rights to certain routes owned by

major wholesale carrier Williams Communications.

The ATM service carries a number of additional options. After choosing their bandwidth level in 3M bit/sec increments, users have a choice of three levels of sustained cell rate (SCR) — a guaranteed throughput similar to frame relay's committed information rate. The choices are 25%, 50% and 100% SCR, with all traffic above the SCR subject to discard and resend in case of network congestion.

GST currently serves 15 local markets, including San Diego, Los Angeles, San Francisco, Portland, Ore., Seattle, Las Vegas, Salt Lake City and Boise.

The company has been attempting to make a name for itself with Internet access prices below those of the top providers. Currently it sells a T-1 Internet access service, for example, for \$990, says Dave Williams, GST's vice president for strategic marketing.

GST: www.gstcorp.com

A CLEC goes high speed

GST offers high-speed Internet access in three flavors — private line, native Ethernet or ATM — at two key speeds.

45M bit/sec	\$24,750*
6M bit/sec	\$3,780

* Fast Ethernet option at 45M bit/sec is \$24,120.



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www.ericsson.com/tigris

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Telecom 99
and
Interactive 99
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ERICSSON 

Exodus,
continued from page 39

Exodus' data centers was one of the reasons the company chose Exodus, he says.

Exodus can bring its collocation and Web-hosting customers' content closer to Web surfers because the company has integrated its caching servers with its Domain Name System servers. This gives the network the information it needs to determine the best method of delivering cached content to individual Web surfers, says B.V. Jagadeesh, chief technology officer.

Exodus is also engineering its network so that when a ReadyCache Service customer's main server is delivering cached content to any of the Inktomi servers, that main server will always be connecting over the Exodus network. This means a customer with its main server in New York is guaranteed that when a Web surfer tries to access the customer's Web site, the cached content will be delivered over the Exodus network, whether that surfer is located in London or Santa Clara. Content Distribution Service customers will be paying a premium for that guarantee.

ReadyCache Service customers will also soon be able to more directly reach users overseas. Exodus signed a \$105 million deal with Global Crossing recently that will expand the company's network into Paris, Frankfurt, Amsterdam and Tokyo, says Allen Hancock, CEO at Exodus.

The network deal gives Exodus indefeasible rights of usage (IRU) access to more than 5G bit/sec worth of bandwidth, which will fuel the company's international data center deployment, Hancock says. Today, Exodus has only one international data center in London.

Exodus is not the first service provider to roll out caching technology. In fact, Digex and @Home Networks have had Inktomi's technology in their networks for several months. And other service providers such as Sandpiper Networks and SkyCache, both using different technology, have based their entire businesses on offering users distributed content

over the Internet.

Jagadeesh says the Exodus approach differs in that the Content Distribution Service is an extension of the company's existing collocation and managed hosting and security services. This eliminates the need for a customer to contract with multiple

vendors to get the same services that Exodus offers.

The service is available now for \$750 per megabit, per month in the U.S. Exodus charges \$1,500 per megabit, per month for traffic outside the U.S.

Exodus has established three U.S.

regions — east, middle and west — as well as a region in Europe. Customers may set up cache servers in any or all of these areas. Customers will pay a one-time installation fee of \$5,000, which only includes one region; additional regions carry a one-time \$2,500 fee.

Exodus: www.exodus.com

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More
Online

- A primer on Web caching.
- Details of Exodus' network.



Vendors battle over control of phone numbers

BY DAVID ROHDE

WASHINGTON, D.C. — Even as federal regulators struggle to figure out how to slow the pace of new area codes, a behind-the-scenes war is raging for control of the nation's telephone number allocation system.

Two vendors — Lockheed Martin and Mitretek Systems — are locked in a lobbying battle to determine which will be the North American Numbering Plan Administrator (NANPA) for the future.

Lockheed Martin holds the current NANPA contract, awarded in 1997 by the Federal Communications Commission, to assign area codes and exchanges around the country. But Mitretek, runner-up in the 1997 contract bid, claims that Lockheed Martin should be stripped of the contract because it has taken ownership interests in carriers in violation of rules requiring the number administrator to be neutral.

On Mitretek's part, the argument involves a big dose of "I told you so" regarding the nation's telephone-number problems, in which new area codes are being created at such a pace that all possible phone numbers may be gone between 2005 and 2007.

Mitretek originally lost the bid partly

Warburg Pincus owned stakes in MCI WorldCom, Covad and other carriers.

Last month, Lockheed made a new proposal in which NANPA would be

spun into a new venture with ownership stakes split among Lockheed, Warburg Pincus, the venture's management and others.

"Our view is that nothing has really changed," says Gil Miller, Mitretek's vice president of telecommunications and advanced technology. But Lockheed's Jeff Ganek, a senior vice president, says the company has put in place its own strict neutrality rules. ■

Area code counter

The pace of adding new area codes is picking up dramatically:

Total possible number of area codes: **680**

Number of U.S. area codes in use now: **215**

Number slated for activation over the next two years: **70**

Number used by foreign countries (Canada and Caribbean): **40**

SOURCE: FCC, WASHINGTON, D.C.

because it said it would have to hire 45 people to run number administration, while Lockheed said it only required 25 people. It also estimated that 68 to 72 new area codes would have to be planned for at any time — about the rate being experienced now (see graphic).

Phone numbers have been running out largely because telcos can only assign them in blocks of 10,000, even to new carriers who only need a handful to start. The FCC has proposed forcing telcos to change their switch software.

The battle began in August 1998 when Lockheed proposed to buy Comsat in a transaction that's still pending. Mitretek complained that Comsat would need phone numbers like any carrier and that would compromise Lockheed's neutrality. Lockheed then proposed to sell its division that includes NANPA to investment firm Warburg Pincus, but Mitretek complained that

it's lurking out there

the one y2k bug you can't see

and you know it will attack

shortly after

Bandwidth mgmt. products get better security controls

BY DENISE PAPPALARDO

Xedia and NetReality are rolling out software enhancements to their bandwidth management systems that make it

easier for users to also control network security from a single platform.

Xedia and NetReality are best known for their bandwidth management devices, which let business users divvy

up Internet bandwidth based on traffic type, URL or IP address. Now the vendors are beefing up their policy managers, which were introduced this spring, to let customers set up network

access, packet filtering — and in Xedia's case even encryption — from one centralized management platform.

The vendors' bandwidth management products, Xedia's Access Point and NetReality's WiseWan, are each equipped with an integrated firewall. Xedia's Firewall/QoS Manager, an upgrade to the company's Access Point QVPN Builder policy management software, lets users set up and make changes to firewalls remotely, as does NetReality's WiseWan Firewall Management (FM) upgrade, part of the WiseWan 3.0 policy manager.

The software enhancements eliminate the need for a net manager to travel to each site where an Access Point or WiseWan device is deployed in order to make changes.



Xedia's Access Point bandwidth management device has gotten a security upgrade.

It's important from an integration and management standpoint that access device vendors develop policy software that lets users perform bandwidth management and firewall provisioning from one management system, says Tracy Vanik, director of edge switching and routing at RHK, a San Francisco consulting firm.

Xedia's Firewall/QoS Manager software began shipping last week. Xedia started shipping its Access Point devices with firewall support in January. Firewall/QoS Manager will let users set up stateful packet filtering, which details where inbound and outbound traffic originated and from what port. This feature lets users disallow traffic from certain points of origin on the 'Net. The software also lets net managers define individual user access preferences and rules.

And because the Firewall/QoS Manager software is an upgrade to Xedia's existing policy manager, customers can divvy up bandwidth using class-based queuing and Differentiated Services (Diff-Serv) technology from one site.

NetReality, which also uses Diff-Serv to let its customers better control IP bandwidth, is rolling out its WiseWan FM software this week. NetReality started shipping firewall software with its WanShaper bandwidth management devices in May, when it announced its first policy manager. Now users will be able to set up rules and policies on all their integrated firewalls from one central location and update the firewalls at the same time.

One key difference between NetReality's and Xedia's firewall support is that NetReality is not yet supporting encryption, but the company plans to fill that gap within the next two months.

Xedia: www.xedia.com; NetReality: www.nreality.com

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Software speeds DSL provisioning

BY TIM GREENE

TORONTO — If you are scared away from trying high-speed digital subscriber line (DSL) services because

you've heard about provisioning nightmares, you may want to reconsider.

Syndesis has customized its provisioning software to streamline the setup of a DSL line. NetProvision Creator for

DSL software can cut the time needed to configure net devices to just minutes, the company claims.

When carriers automate the provisioning process, customers get their DSL services turned on faster, according to Will Walling, manager of management systems development for US West's

Enterprise division. Enterprise Syndesis NetProvision Activator issues the commands that configure individual network devices.

Establishing a DSL circuit involves configuring many devices, including the customer modem, the DSL multiplexer in the carrier switching office, aggregation devices, and core switches and routers, to name a few.

"DSL provisioning is pretty complicated. [NetProvision Creator] allows to be done quicker, as long as all the equipment is in place," says Jim Mason, director of research for network management and operations support at



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Getting DSL faster

Software from Syndesis automates provisioning of digital subscriber line services, cutting the time it takes to get high-speed access.

- NetProvision Creator for DSL automates service profiles, such as speed of connection and to which ISP to connect.
- Based on the service profile, NetProvision Activator automatically provisions devices in the carrier network to deliver a service within seconds.

terms at Probe Research in Cedar Knolls, N.J. By eliminating paper-based provisioning requests, the process is not just speeded up, but the number of provisioning errors that can occur is minimized.

NetProvision Creator defines DSL in plain language DSL service profiles such as the speed of a line. This lets service representatives who take customer orders for DSL services use the software. NetProvision Creator then translates those profiles to NetProvision Activator.

Using NetProvision Creator, a service provider could enable customers to modify their DSL-based service via a secure Web site, according to Matt Steinmann, Syndesis' vice president of marketing.

For example, a customer with a 1.5-Mbit/sec DSL service could request an increase that bandwidth to 3.1-Mbit/sec via NetProvision Creator on a Web site. The requested change would be carried out by NetProvision Activator.

In the future, the service could be extended to let customers request extra phone lines, he says. DSL providers later this year plan to introduce services that support multiple voice channels on a single DSL line. With NetProvision Creator and a Web interface, customers could turn up extra lines as they need them, Steinmann says. "Competitive long-exchange carriers could be more responsive than [established local phone companies] are in provisioning new lines," he says.

NetProvision software is embedded in operations and support systems software used by carriers to manage and provision their networks.

Syndesis www.syndesis.com

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Wan Monitor . Daniel Briere and Christine Heckart

LOOKING BEYOND NOSE RINGS AND PURPLE HAIR

To hear some companies talk today, you would think no qualified IT workers could be found for thousands of miles at a stretch.

However, if these companies would only expand their searches beyond employees who sport nose rings and spiked hair, they will find good workers.

Yes, we are talking about the dreaded "over-age-40" candidates and their "outdated" knowledge and experience.

The top five reasons most companies

do not hire 40-plus workers are:

No. 5: "They are unwilling to change their ways."

Believe it or not, change has been happening for a long time. Twentysomethings and thirtysomethings did not invent change; it's just happening faster now. Older workers have experienced change from mainframes and glass-houses to the rise of PCs, LANs and WANs. Current trends such as client/server, distributive networking and hosted applications are just new flavors of old favorites. Like recycled fashion, it all comes around again and again.

No. 4: "The 40-plus workers want higher salaries."

You get what you pay for. The experience the 40-plus worker brings not only to his position, but also to the rest of the IT team, can be invaluable. Just ask MCI WorldCom or Lucent if they could have used a few more older, wiser, grayer, experienced network engineers during the recent frame relay meltdown. Plus, consider the replacement and retraining costs when that twentysomething jumps ship in a year for more money. The 40-plus worker may value stability and will not be lured away by a competitor waving free pizza and Jolt Cola.

No. 3: "Over-40s do not have the current skill set our company needs."

How many companies are still running mission-critical applications on legacy systems more than 5 years old? With the network meltdowns and electronic commerce Web site crashes going on, it would appear that some skill sets never go out of style. Critical IT skills such as disaster-recovery planning, multisystem integration, maintenance of 24-7 operations, live systems upgrades and management of mission-critical systems come from the "been there, survived that" 40-plus workers.

No. 2: "Older workers don't want to take orders from those 10 or 20 years younger."

Maybe thirtysomething managers need additional training if they can only effectively lead twentysomethings.

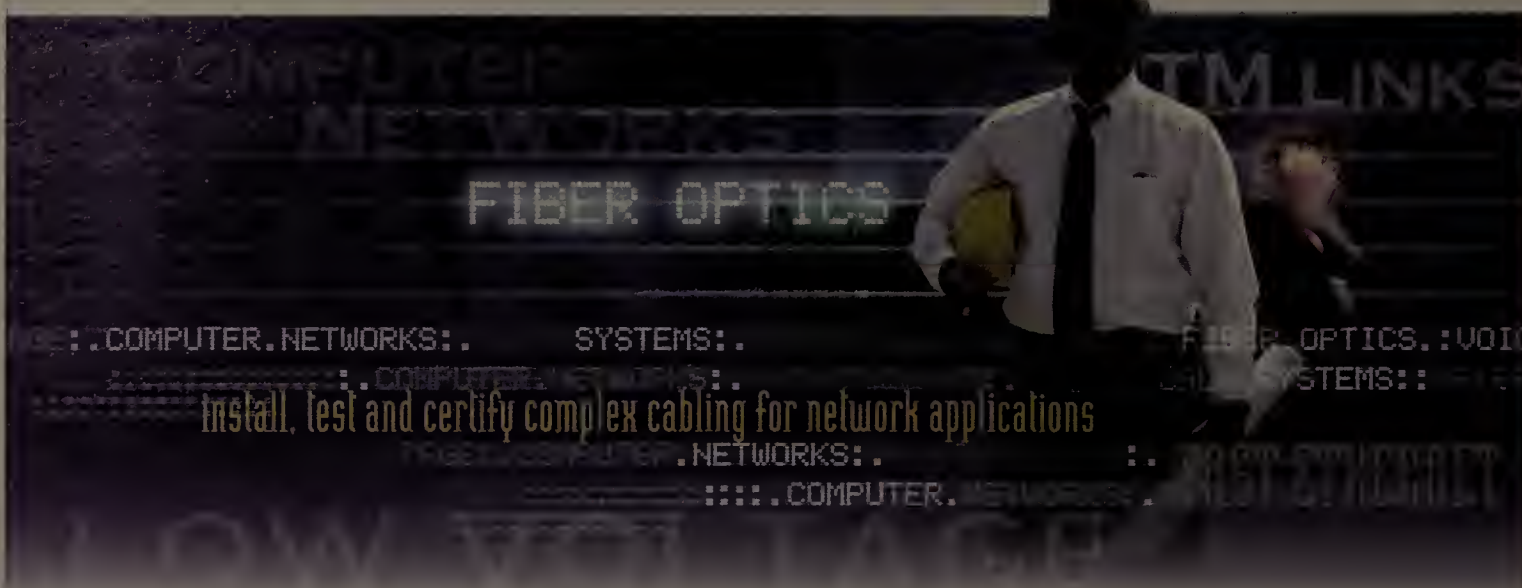
No. 1: "They do not want to work the 14-hour days that younger employees are willing to work."

Do not confuse willingness with need. Could it be possible that an over-40 employee has the knowledge, experience and ingenuity to accomplish the same work in less time? The IT veteran might help your twentysomething stars work smarter instead of harder.

An older employee may not have body-piercing experience. However, think how much you will know 15 years from now, and ask yourself if some company might benefit from that knowledge.

Briere is president and Heckart is vice president of TeleChoice, a consultancy in Boston. They can be reached at dbriere@telechoice.com and heckart@telechoice.com.

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Briefs

Corporations that want to put their financial statements on the Web will soon have an easier way to do it, thanks to a new specification being developed by a team of IT companies and accounting firms. Based on XML, the new specification will allow companies to create financial reports once for publication, submission to the Securities and Exchange Commission, and posting on the Web. Companies currently rekey financial information three separate times.

The XML-based **Financial Reporting Markup Language (XFRML)** will be the "digital language of business," according to the American Institute of Certified Public Accountants (AICPA), which is leading the effort. Now in draft form, XFRML will offer a standard way to prepare, publish, exchange and analyze financial reports. It also will provide built-in tagging so financial statements will be easier to search on the Web. XFRML will also use network bandwidth efficiently.

AICPA officials expect to publish a final specification next March, followed by the announcement of compliant products from various vendors. For more information, go to www.xfrml.org

WinWhatWhere Corp. has released Investigator 2.0, which logs a user's keyboard strokes and application usage. The software is intended for deployment behind a corporate firewall in order to track computer usage, especially in government or competitive business situations. The program features automated e-mail notification and a Silent Install utility for undetected deployment. Investigator 2.0 runs on Windows 95, 98 and NT 4.0, and is priced at \$99 per user or \$5,500 per site.

WinWhatWhere: www.winwhatwhere.com

Aspect hits the comeback trail

Call center switch vendor turns to customer relationship management software.

BY DAVID ROHDE

SAN JOSE — A venerable vendor of telephone switching systems for call centers is trying to recover from operating losses and a severe stock slide by pushing into the market for customer relationship management software.

Aspect Telecommunications, which provides automatic call distributors (ACD) that route telephone calls to live agents, recently rolled out two software packages that unify Internet and telephony-based contact data.

The Aspect Customer Relationship Portal integrates commercially available e-mail response software packages with the call-by-call routing schemes in telephony ACDs to decide in real time which agents should answer calls, e-mail and faxes.

The Aspect Customer DataMart is an application loaded on a Windows NT server that analyzes all transactions — whether conducted by Internet, fax, interactive voice response or live agents

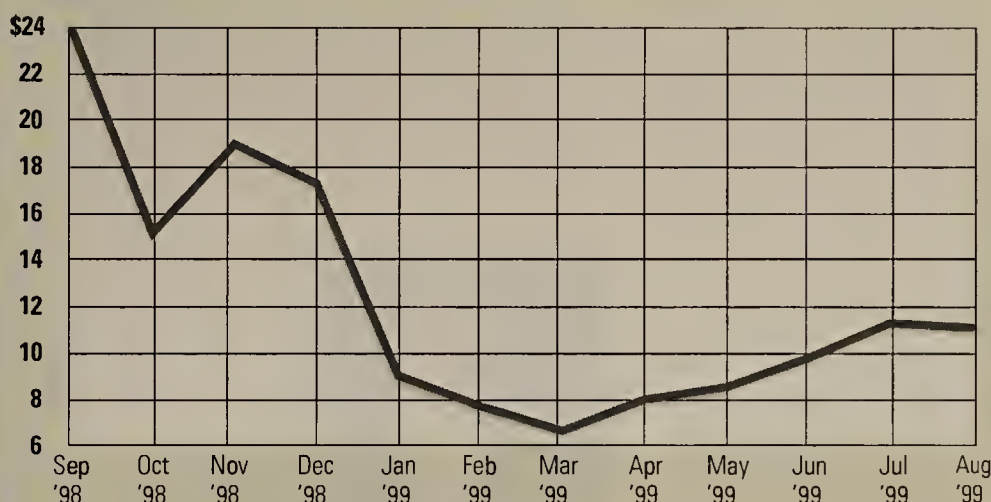
See **Aspect**, page 52

Back from the abyss

In an attempt to recover profitability after a severe stock slide over the past year, Aspect is:

- Putting most of its research and development dollars into customer relationship software.
- Bringing in new managers from Oracle and other software houses.
- Trying to sell applications to users with competitors' call center switches.

Aspect's stock price:



SOURCE: NASDAQ, NEW YORK

New tools keep eyes on Web site performance

BY JEFF CARUSO

As companies venture into e-business, much of the infrastructure they depend on is outside of their control — and that can be a scary proposition.

Vendors are trying to take the fear out of e-business with management software and services to keep tabs on Web site performance. At this week's NetWorld+Interop '99 Atlanta, Manage.Com will start offering a free response-time monitoring service. Hewlett-Packard last week introduced OpenView Observer, software for companies that want to measure response time themselves.

Manage.Com is currently beta-testing its service, for which users register three of their own URLs and 10 URLs of their partners. Periodically, the Manage.Com server will access the Web pages at those URLs and record

how long the accesses take. Users can check their sites' current response time by looking at Manage.Com's Web site.

With the service, users get a peek into the network performance of the companies with which they do business.

"You've really got to have a management product that extends across organizational boundaries," says John McConnell, president of McConnell Associates in Boulder, Colo.

While the service is free, Manage.Com hopes to interest users in future services. For instance, the vendor is looking at charging fees for more than 13 Web pages or for showing response-time trends over long periods of time, says Bob Quillan, vice president of marketing at Manage.Com.

The initial service is limited in that it only shows response time from Manage.Com's server, hosted by Qwest. "But

that's still more than you're getting from other vendors — and you're getting it for free," McConnell says.

A different tack

HP is taking a more conventional approach, following in the footsteps of

See **Web site**, page 50



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Automakers look to strengthen struggling VPN

Automotive Network Exchange branches out to embrace insurance and steel industries, as well as overseas firms.

BY ELLEN MESSMER

DETROIT — For a year now, the Automotive Network Exchange (ANX) has been the U.S. auto industry's high-security IP network for sharing data among trading partners. But now the ANX is starting to open its doors to the insurance and steel industries as well.

The ANX is also reaching out to overseas companies, including Toyota, which just joined the network. New network installations are also planned in Europe, Japan and Latin America.

The Big Three car companies — General Motors, Ford and Chrysler (now DaimlerChrysler) — originally built the ANX with their trade association, the Automotive Industry Action Group (AIAG), to secure data communications within the busy Detroit/Windsor car manufacturing zone. These organizations are now looking to expand their electronic commerce circle and bring more network users into the ANX, which is losing money and struggling to bring down costs.

"We believe ANX is entering a new era of acceptance . . . with new capabilities," Ford's ANX development leader, Dennis Kirchoff, recently told the thousands of auto suppliers attending the AutoTech show in Detroit. "We claim ANX is an open virtual private network, while most VPNs you learn about are proprietary. But ANX needs to grow by penetrating other industries."

The ANX has a lot of things

going for it to entice new participants. However, the network still needs to overcome some problems, including high prices and a lack of interoperability among security technologies.

The managed 56K bit/sec to T-3 IP links for the ANX are provided exclusively by a set of Certified Service Providers (CSP) — EDS, AT&T, MCI WorldCom, BCE Emergis and Ameritech. Frontier Technologies appears set to join their ranks soon. These CSPs must meet technical requirements enforced by the ANX's official overseer, Telcordia Technologies (formerly Bellcore).

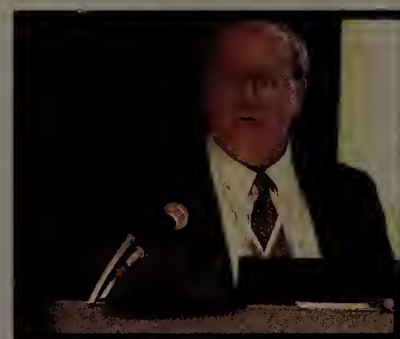
Auto suppliers that want to use the VPN have to install ANX-approved IP Security (IPSec) firewalls, gateways or



"We are working with the [Certified Service Providers] to bring down costs."

Terry Schade, ANX project manager, DaimlerChrysler

routers for authentication and encryption. Because of the difficulty in getting IPSec-based equipment to work together, the ANX has limited users to security products from Axent, Check Point, Cisco, Radguard and Time-



Step, says Karl Schohl, AIAG's network manager.

"We're still having interoperability problems, so we're choosing IPSec equipment that the CSPs use," Schohl says. This way, ANX users can opt to have CSPs offer IPSec as an encryption service if users can't manage the equipment themselves.

The AIAG's original plan called for ANX users to have digital certificates for gateway and client-side authentication. But ANX-approved equipment still can't reliably swap digital certificates from Entrust, the sole vendor chosen. So ANX users — there are now 200 of them — have to manually input long text strings called 'shared secrets' instead of using digital certificates.

Without digital certificates, it will be even more difficult for the network to support the more than 10,000 suppliers to the Big Three auto makers.

The Big Three want the ANX to replace value-added

networks currently used for electronic data interchange (EDI) and private links used for mainframe and CAD/CAM transfer.

GM executive Grenell Jones says his company is calling up suppliers that make use of cer-

bit/sec Internet dial-up service. But even this service will cost \$140 per month, far more than the typical IP service costs. Ideal's founders, brothers Mike and Robert Skinner, say their service will require users to have IRE

"We believe ANX is entering a new era of acceptance . . . with new capabilities."

Dennis Kirchoff, ANX development leader, Ford

tain types of CAD/CAM and requiring them to use the ANX. In addition, GM will test EDI applications on the ANX later this fall.

Ford is planning a similar EDI migration to the ANX.

The Big Three have also issued a joint letter to 300 suppliers requesting that they each do a price evaluation to compare costs of maintaining multiple network links vs. going with the ANX. Suppliers have traditionally been obligated to do what the Big Three want.

The problem is, ANX services still cost two to three times what Internet-based ones cost, and Telcordia charges ANX users an additional 10% fee each year. "We are working with the CSPs to try and bring down costs," acknowledges Terry Schade, DaimlerChrysler's ANX project manager.

According to several sources, Ideal Technologies of Royal Oak, Mich., will soon be ANX-certified to offer a 56K

Corp.'s IPSec client and the VeriSign digital certificate to authenticate and encrypt ANX traffic.

While ANX users say such a dial-up service is needed, one current ANX user with an IPSec gateway expresses exasperation. The VeriSign certificates are going to raise yet more interoperability issues for the ANX, which can't get the Entrust certificate situation straightened out, says the user, who requested anonymity.

But AIAG is under pressure to get more users on the ANX. As a result, AIAG has handed the ANX management reins to Telcordia's parent company, SAIC. According to SAIC official Tracy Trent, the company snagged the deal by agreeing to donate technical expertise and money toward making the ANX work on a global scale. While SAIC will be on the hot seat, the company should be in a good position to take advantage of new business opportunities if the ANX catches on. ■

Web site,
continued from page 49

start-ups such as NextPoint and FirstSense, McConnell notes.

To measure network performance, OpenView Observer uses software agents deployed on a user's PC. Network managers configure which transactions they want each agent

to monitor. When those transactions occur, agents measure the time it takes transactions to be completed.

The 80K-byte agents encrypt and send the response-time data to a collection server, which stores it in an Application Response Measurement (ARM)-compliant format. At the server, the data can be correlated with infor-

mation about the end-user's ISP, modem, location and other data.

Error monitoring

The software can also keep track of the number of errors and volume of activity, says John Peters, an HP marketing executive. With this data, companies can watch their Web sites, monitor response times

and keep track of how many customers abort their online activities.

While not unique, the software is part of a growing trend toward direct management of e-business and electronic commerce, McConnell says.

Observer is the first product resulting from HP's e-services push. The company

unveiled the initiative in June, but HP omitted product specifics.


OpenView Observer will ship next month, and it will work as a stand-alone product or in conjunction with other OpenView software. Pricing was not disclosed.

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Aspect,
continued from page 49

— to produce management reports.

The two packages together also link to back-office customer databases so agents handling inquiries on the phone

or online can see a history of each customer's relationship with the company. The goal is to "make sure that the corporation doesn't appear to have corporate amnesia," Aspect CEO Jim Carreker says.

The new products are not exactly off-the-shelf software. The Customer

Relationship Portal requires that the call center have a recent release of Aspect, Lucent or Nortel Networks call center switching systems. Release 1.0 of Customer DataMart only works with the latest release — Version 7.2.1 — of Aspect's own ACD.

The new products were released this summer after a wrenching period in which Aspect suffered a rocky entry into call center outsourcing, some product problems and a management shake-up. The company also posted a second quarter loss of \$12.5 million.

Last fall's Release 7.0 of the Aspect CallCenter ACD, which increased capacity from 1,500 to 3,000 agents, originally suffered problems in which agents could hear cross-talk on one another's lines, says Art Schoeller, a research director at Gartner Group. Aspect also began pushing consulting and professional services, but the company could not generate enough business to keep busy.

■ **"[The goal is to] make sure the corporation doesn't appear to have corporate amnesia."**

Jim Carreker, CEO, Aspect

"The sales force was not as adept at selling integration services," Schoeller says.

Then earlier this year, the company's No. 2 official, Dennis Haar, and marketing vice president, Robert Blatt, left the company, reportedly along with a chunk of the sales force.

"They really have had tremendous turnover," says Sheila McGee-Smith, an analyst with the Pelorus Group in Raritan, N.J. As Aspect began reporting losses, its stock plunged from near \$30 to around \$6 per share, though it has at times recovered to above \$10.

To help itself recover, Aspect brought in a number of software executives from Silicon Valley, including Oracle veteran Beatriz Infante to serve as one of two co-presidents.

Infante says Aspect is still selling highly customized call center products, but the goal is to take a typical \$3,000-per-seat installation and charge on a software-license basis, around \$2,500 per seat plus \$500 for the hardware — the reverse of Aspect's previous pricing strategy.

Part of that plan is to enable Aspect to branch out beyond its own installed base of call center hardware switches into competitors', Gartner's Schoeller says. Lucent has generated tremendous momentum in large call center sales, he says, but Aspect's moves are "a competitive attack on the Nortel Networks and Siemens bases," he says. "Those are the most susceptible bases."

Aspect: www.aspect.com

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NetVision links Active Directory, NDS

BY JOHN FONTANA

OREM, UTAH — Although Microsoft's Active Directory will eventually enjoy widespread use when Windows

2000 ships, it by no means will be the only directory in the enterprise.

NetVision next month will unveil Synchronicity for Active Directory to help users synchronize data between

Microsoft's directory and Novell Directory Services (NDS).

For those users piloting Microsoft's yet-to-be-released directory, NetVision is offering something Microsoft currently is not — bi-directional synchronization between Active Directory and NDS.

The software exploits Active Directory Service Interfaces to let NDS administrators browse Active Directory and add, delete and modify directory objects and attributes.

Microsoft offers a mechanism called DirSync which allows users one-way synchronization between NDS and Active Directory. Users and developers say Microsoft needs to update DirSync to provide bidirectional capabilities.

However, Microsoft plans to leave a majority of its synchronization work to Zoomit, a metadirectory vendor that Microsoft acquired in July.

"We are not a metadirectory," says

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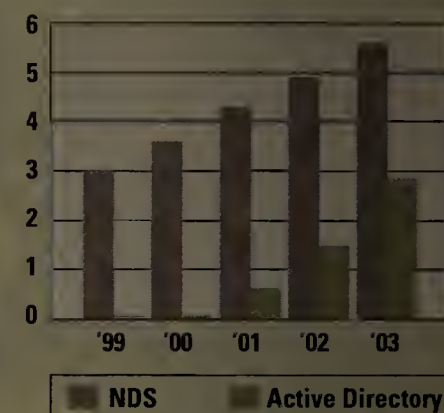
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Directory integration

With Active Directory use expected to explode when Windows 2000 ships, users will be looking for ways to integrate Microsoft's directory with existing directories, such as Novell's popular NDS.

Projected installed base
(In millions of units)



SOURCE: IDC, FRAMINGHAM, MASS

Todd Lawson, president of NetVision. "For those users who just want to integrate their Active Directory and NDS environments, then Synchronicity is easier to use than a metadirectory."

Synchronicity for Active Directory uses a technology called Global Event Services to detect any change in real time in either NDS or Active Directory and replicate the changes between directories. It lets administrators tune replication down to the attribute level in order to selectively copy data.

Synchronicity uses a NetWare Administrator snap-in module that permits net administrators to add, delete or modify entries in either NDS or Active Directory.

At the end of the month, NetVision also will ship DirectoryAlert, a notification and auditing system that tracks changes made in a directory.

Synchronicity is expected to be available when Windows 2000 ships. A beta version will be available at the beginning of next month for use with Beta 3 of Windows 2000. The software is priced at \$18 per user.

NetVision: www.netvision.com

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Right Now beefs up Web customer service application

BY ELLEN MESSMER

BOZEMAN, MONT. — Right Now Technologies last week gave its

Web customer service application new modules to handle service-warranty contracts, as well as support for online chat and phone

callback requests.

Right Now Web 3.0 runs on a Unix or NT server and sits between a Web server and a database, such as Oracle,

Microsoft SQL Server or the Linux-based MySQL.

The software can query these databases based on customer questions, which are entered via Web forms. Questions can also be answered by routing them to the appropriate manager or by sending the customer a frequently asked question (FAQ)-style information sheet.

The Right Now Contracts module offers custom reporting in addition to the existing preconfigured reports.

The module can also be used to administer service contracts, such as those for parts warranties, via the Web. For instance, Right Now Contracts can tell online customers that their free service warranties have expired, according to Right Now CEO Greg Gianforte. The module can also inform customers that a self-help FAQ list is always available for free even after the warranty has expired.

Right Now Contracts is shipping now.

Another module called Surveys, set to ship later this month, can be used to design online customer satisfaction surveys that can be sent out automatically.

In November, Right Now will ship a third module called Right Now Live, which will support chat or a Web-initiated phone callback request. "You'll just add a button to your main Web page, calling it whatever you like, such as 'online customer help,'" Gianforte says.

The Right Now Contracts and Surveys modules will cost around \$10,000 each, on top of the base price of \$19,500 for a two-year license for Right Now Web. Right Now Live has not been priced.

Xerox has been using Right Now Web to speed the response to reseller questions from around the world.

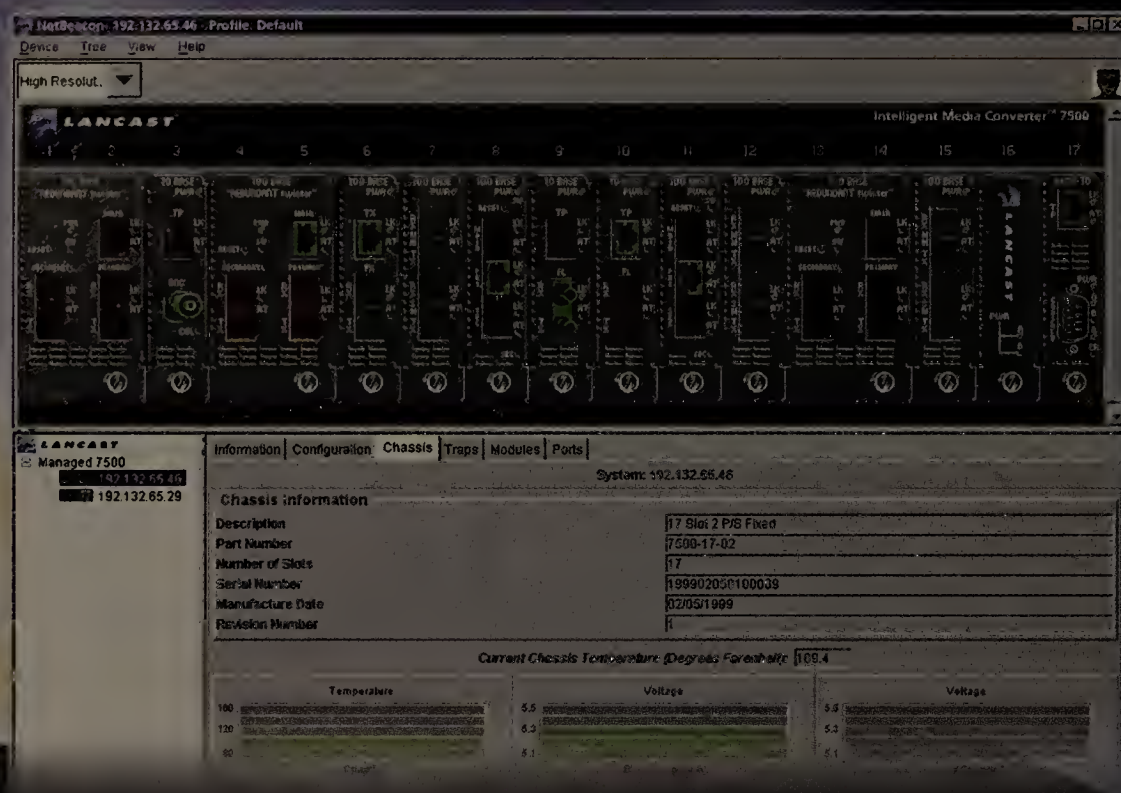
"One thing we've learned is we can't offer phone support around the clock in Europe and Asia," says Ken Corpus, Xerox engineer and technical support specialist. "And we needed something better than just e-mail to answer these questions."

Corpus says that by adding Right Now Web to the Xerox electronic commerce site the company was able to post searchable and "dynamic" FAQs that work better than static FAQs.

In November, Right Now plans to ship a software developers tool kit to link the Right Now Web application with e-commerce applications from Remedy and Vantive, among others.

Right Now: www.rightnowtech.com

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*Figures assume 2:1 ALDC hardware compression. \$1295 MSRP for internal kit.

New spec to add life to Web presentations

Revised SMIL specification putting a grin on developers' faces by allowing more interactive multimedia Web applications.

BY CAROLYN DUFFY
MARSAN

The World Wide Web Consortium has given the public its first peek at a new specification that will make it easier to create multimedia presentations for distribution over the Web. Released as a working draft, the specification supports richer animation, improved interactivity and easier navigation than the original version.

The specification offers enhancements to the Synchronized Multimedia Integration Language (SMIL), pronounced "smile."

SMIL 1.0 was the first specification for Web-based multimedia when it was finalized last year. The new specification, code-named SMIL Boston, should be completed in 12 to 18 months. Members of the SMIL Boston working group are a Who's Who of Internet

multimedia companies: Microsoft, RealNetworks, Macromedia, Intel and 10 others.

"SMIL Boston is significant because it's telling the market and it's telling developers . . . that some really fundamental enhancements are being made to SMIL," says Peter Zaballo, director of systems marketing at RealNetworks, which supports SMIL in its RealSystem G2 for streaming audio and video.

"So anyone investing in SMIL will see years and years of fruitful deployment and usage," he says.

More interactivity

"We're really interested in SMIL Boston because we see the emergence of a standard for multimedia presentations on the Web as very important," says Ken Day, principal engineer at Macromedia, which does not yet sup-

port SMIL 1.0 in its product line. "The biggest advantage of SMIL Boston is that it expands the developer's ability to add interactivity to Web-based multimedia."

Multimedia Web tool

SMIL Boston will make it easier for developers of Web-based multimedia content to do the following:

- Create animations.
- Offer optional content.
- Build navigational guides.



SMIL 1.0 provides a simple text editor for creating audio-visual presentations for the Web. It allows developers to organize how and when sound, images, animation, text, graphics and video are delivered to the viewer of a

multimedia presentation. In particular, SMIL 1.0 helps control the timing of when a viewer sees particular images, so the viewer's experience is more predictable. SMIL is designed to make efficient use of network resources and conserve bandwidth.

SMIL Boston builds on that foundation by supporting more types of animation and making it easier to create animations. The new specification also makes it easier to offer optional content to a viewer without interrupting the main presentation. And SMIL Boston simplifies the way developers create buttons that viewers can select to jump to a particular part of a presentation.

But most important, the new edition of SMIL will be delivered in reusable modules from which developers can pick and choose; SMIL 1.0

See **SMIL**, page 60

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Canobeam III also features a one-piece design, where the controller is built into the head unit, as well as SNMP (optional). For more detailed monitoring of the DT-50, the unit features a Remote Monitoring Function in which an RS-232C cable is connected between the unit and a PC.

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SMIL,
continued from page 58

was a single piece of code.

"What SMIL 1.0 allowed the market to see is that the Web could be viewed as a resource for interactive

multimedia," RealNetworks' Zaballos says. "SMIL Boston will bring Web-based multimedia much closer to the functionality and performance you get with a CD-ROM."

Large organizations are using SMIL on their intranets to offer multimedia

content, such as executive briefings, training videos, sales presentations and television news channels.

Novell, for example, is using SMIL to catalog 500 to 600 hours' worth of video offered on its public Web site and another 200 hours of video on

its intranet.

Ben Brimhall, a business media analyst with Novell Web services, says once the video is retrofitted for SMIL, Novell's sales people will be able to create custom videos quickly and easily for sales presentations. Novell is using the RealSystem G2 and Oracle's database software to do the retrofitting.

"We are working on marking up all our video content. We're putting identifiers in it so we know what is happening in a video at different time points," Brimhall explains. "Sales people will be able to look through the library of video clips and build a presentation on the fly for their customers."

Brimhall says SMIL will cut the time it takes to create a custom presentation from several hours to a few minutes. Plus, sales people, rather than specialized media analysts, will be able to do the job.

"The key value to SMIL is the ability to edit video content like you edit an HTML page. It simplifies the process so it's not this convoluted, difficult studio process," he says. "You can update information quickly without having to re-purpose video content."

The SMIL experience

LearnKey, a St. George, Utah, publisher of computer-based training titles, has created 63 four-hour courses that were written in SMIL using the RealSystem G2. The courses, which teach computer skills and certification requirements, are available via corporate intranets or the Internet.

"What LearnKey was looking for is a way to have multiple types of streaming data. What SMIL provided was an open standard," says David Clemons, executive vice president of LearnKey. "SMIL made our development faster and more streamlined. It didn't take an \$80,000-per-year engineer. We could teach entry-level programmers to make training content quickly."

Users of LearnKey's titles select a topic, and then the SMIL file is automatically generated and starts streaming video. The video can be streamed at 28.8K bit/sec, 56K bit/sec, 112K bit/sec or 200K bit/sec, depending on the amount of bandwidth the network can handle. The video is shown in a window that takes up about two-thirds of a monitor's screen.

Clemons says LearnKey is watching the activities of the SMIL Boston working group.

"If SMIL Boston offers features to enhance intranet-based training, we will consider it," he says. "Now we're in study mode." ■

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9NK3

'Net Insider . Scott Bradner

WHEN IS HTTP 1.1 NOT HTTP 1.1?

I maintained in a public forum the other day that HTTP 1.1 was widely deployed because I heard that HTTP 1.1-compliant browser

and server software were widely deployed. It turns out that even if my information was right, the implication was wrong.

This year's Association for Computing Machinery (ACM) Special Interest Group on Data Communication (SIGCOMM) meeting (www.acm.org/)

sigcomm/sigcomm99/) was held at Harvard a week ago. It was quite an event, with even more on tap than the usual complement of cutting-edge research papers.

To commemorate the 10th anniversary of the SIGCOMM Lifetime Achievement award, there was an all-day tutorial on the technical history of the Internet, lead by Vint Cerf, that included just about every major player in the technical history of the 'Net. There was an evening panel of all past award winners (other than Jon Postel, who passed away last year). The evening panel was moderated by Ethernet inventor Bob Metcalfe.

During the evening, Metcalfe asked the panel how we could get HTTP 1.1 more widely deployed. This would be a good idea, he said, because use of HTTP 1.1 — last year's revision of the Web transport protocol — might help improve the performance of the Internet. I was sitting in the front row of the audience and made a comment, I thought mostly to myself, that HTTP 1.1 was already widely deployed (implying that it was a silly question.) My comment was picked up by some of the panelists, and Metcalfe moved on to another question.

But the next day I was approached by an AT&T researcher who politely implied that I had no idea what I was talking about. In particular, she had quite a bit of research data that showed that the new functions in HTTP 1.1 that made it better than HTTP 1.0 do not show up very often on the 'Net. Suitably embarrassed, I tried to find out how my information could differ so much from the empirical data she collected.

I made my assertion based on the deployment of software that claims to be compliant to the HTTP 1.1 draft standard, but much of this software turns out to not have the advanced features turned on by default. Because most users would not think of figuring out how to enable these features, they do not get turned on. This means that it's not good enough to get the vendors to implement new features, you also have to get them to turn the features on.

At this point it seems that the claim HTTP 1.1 is widely supported is false advertising. This is not going to make deployment technology upgrades to the 'Net any easier, and it's going to make determining what is going on a lot harder than counting software version numbers.

Disclaimer: Harvard does not need advertising, false or otherwise, and the above is my observation.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@harvard.edu.

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How to pick a Java application server

BY JOHN COX

In the short history of the Web, the key decision has often been which Web server to pick. Today, for large corporations, the big decision has become which Java application server to choose. Selecting an application server is much more complicated than picking a Web server, but the experiences of early adopters provide some practical guidelines.

You can think of application servers as bridges, connecting the Web with existing back-end databases, transaction systems and business applications.

More technically, an application server gives you three things: tools to build applications as a set of software components; server-based programs to host, run and manage these components; and interfaces so the components work with an array of existing systems.

Java products are hosts, or "containers," for Enterprise JavaBeans, which are software components written to one of the APIs in the Java2 Enterprise Edition (J2EE) specification. J2EE, which will be released formally later this month, is being viewed by many corporate IT managers as the key to deploying larger-scale Java applications on the Web because of the additional services it describes, as well as its Enterprise JavaBeans programming model. This specification already is being implemented in application servers from an array of vendors.

A new report from Ovum, a London technology research company, predicts dramatic growth in the application server market during the next five years (see graphic). Ovum analyst Gary Barnett predicts the high-end products will become "integration hubs" that will let corporations selectively grant access to internal business processes to certain outsiders, including suppliers, customers and partners.

Most corporate IT groups assess application servers as they do any other key part of the enterprise net: They perform a needs analysis; create a comparative features checklist; factor in prices; evaluate the vendor; and conduct testing.

But those who've deployed application servers say their experience shows some other key areas to take into account during evaluation and production.

Because the Java application server is being chosen for online transaction-oriented Web applications, it has to behave like the Energizer bunny: It must keep going and going and going.

"We decided on PowerTier [from Persistence Software] for a simple reason," says Larry O'Brien, a project manager at i-mind Education Systems in Mill Valley, Calif., which markets its Internet portals to public school systems. "They have battle-proven code in their applications server. Their PowerTier product grew out of an existing C++ product that we knew worked."

"When creating a server-side Java system, you rely on the Enterprise JavaBeans container [that is, the application server] to provide scalable reliability under load and during failover," O'Brien continues. "It's not a

APPLICATION SERVERS

Early adopters say scalability, performance are key buying criteria.

place for rookie code."

Scaling, or the ability to run the application server on a growing number of processors and computers, is almost equally important, says Frank Greco, president of Crossroads Technologies, a New York systems integrator that specializes in building application server-based systems for Wall Street companies. "An application server that does not scale is useless," he says.

Greco recommends you make sure the application

documented and evaluated, too. "Have a competent security firm audit the vendor's security architecture, your own system architecture and your applications," Greco says.

Development tools for building the components hosted by the application server are still evolving, especially those that claim to be Integrated Development Environments (IDE). These tool sets are intended to give developers everything they need to build applications, with all the tools working smoothly with each other. The reality at this stage is quite different.

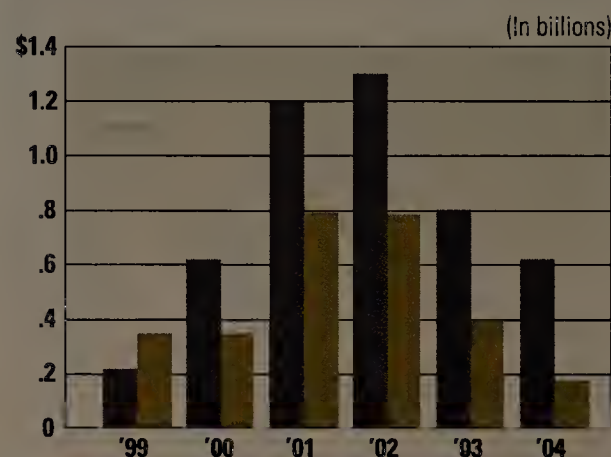
"The quality of the 'enterprise' versions of the Java IDEs has been a continual disappointment to me," i-mind's O'Brien says. "You pay a huge performance penalty to have access to visual form-builders that are of no use to server-side development."

An analysis of 11 Web development tools and their included application servers by TechMetrix Research of Burlington, Mass., found the servers differed widely in the completeness of their feature sets. The report cited a handful of vendors that combined viable appli-

Webify this

In the short run, corporate IT groups will "Webify" existing applications, creating Web-based user interfaces to access them...

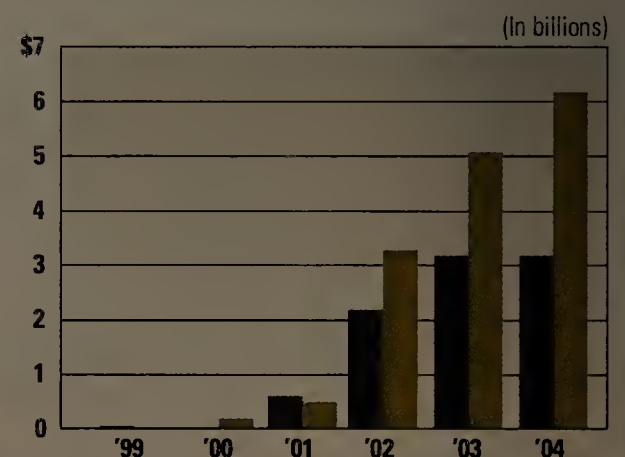
Estimated revenue from products and services for the Webification of existing enterprise applications:



SOURCE: OVUM, LONDON

... but in the long run, spending will shift as enterprises focus on brand-new Web applications hosted on application servers that connect to back-end databases and transaction systems.

Estimated revenue from products and services for enterprise Web application development:



server can handle "at least triple your load estimates."

Closely tied to scaling, is performance. The application server should have a multithreaded design for optimal power, Greco says. The IT group should know the number of transactions that have to execute in a given time and ensure that the server can handle that figure.


After the application server is running in production, the IT group needs to monitor performance continuously. "Be sure to quantify your requirements and constantly measure the product's performance against your target metrics," Greco says.

The application server's security features need to be

cation servers with application tools in a single package. Such offerings include Apple's WebObjects, Bluestone Software's Sapphire/Web, Haht Software's HahtSite and Pervasive's Tango. Others highlighted included Netscape's Netscape Application Server (formerly Kiva), SilverStream's SilverStream Application Server and Oracle's Oracle Application Server.

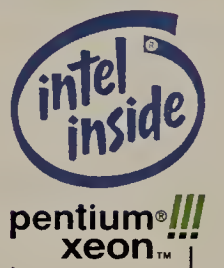
Nearly all of these vendors have announced plans to support J2EE and Enterprise JavaBeans, in particular.

But remember, Java application servers are complex, and you'll need to do your homework before choosing and implementing these still-evolving products. ■



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Technology Update

An Inside Look at the Technologies
and Standards Shaping Your Network

Ask Dr. Intranet

By Steve
Blass

Our intranet users are being migrated from Netscape Mail to Microsoft Outlook 98 (Exchange), but we plan to continue

supporting the Netscape browser.

Our problem is that clicking a "mailto:" link within Netscape will only open Netscape Messenger as the mail client when we want Outlook to open.

We've already made sure that within NT the file type "URL MailTo Protocol" is associated with Outlook. How can we force Netscape to open Outlook?

Via the Internet

Netscape Communicator lets you specify which Dynamic Link Library (DLL) to use in answering requests for viewing the Inbox, checking for new messages or sending new mail by letting you edit the prefs.js file in the \Program Files\Netscape\Users\<username> directory.

A DLL for launching Outlook instead of Netscape Messenger is available free under the Mozilla Public License from www.macgyver.org/software/outlook/nsoutlook.zip. Instructions for installing the DLL and configuring Netscape are at www.macgyver.org/software/nsoutlook.html.

After the NSOUTLOOK.DLL is installed, Netscape Communicator will launch Outlook when you click on a mailto: link, use the Netscape Inbox button or choose File|New|Message from the menu. You will have an entry for Outlook in the Communicator|Tools menu so you can launch Outlook from the Netscape toolbar.

Blass is a network architect at Sprint Paranet in Houston. You can reach him at drintranet@paranet.

Protocol work melds storage methods

BY SUE SMITH

Sharing data across multiple clients on a storage-area network (SAN) is easier said than done. As a result, the File System Working Group (FSWG) of the Storage Networking Industry Association is developing a proposal to bring the data-sharing capabilities of network-attached storage (NAS) devices to SAN environments.

NAS devices provide alternative storage for authorized clients on a LAN. Also known as storage appliances or multiprotocol filers, NAS devices are

the specific client storing the data. Bringing file sharing to a pure SAN configuration requires the implementation of a heterogeneous clustered file system. Such a system is currently unavailable because its high degree of technical complexity makes it prohibitive from cost and performance standpoints.

On the other hand, merging existing NAS and SAN technologies is a highly realistic SAN file-sharing proposal. Several vendors have already introduced proprietary solutions.

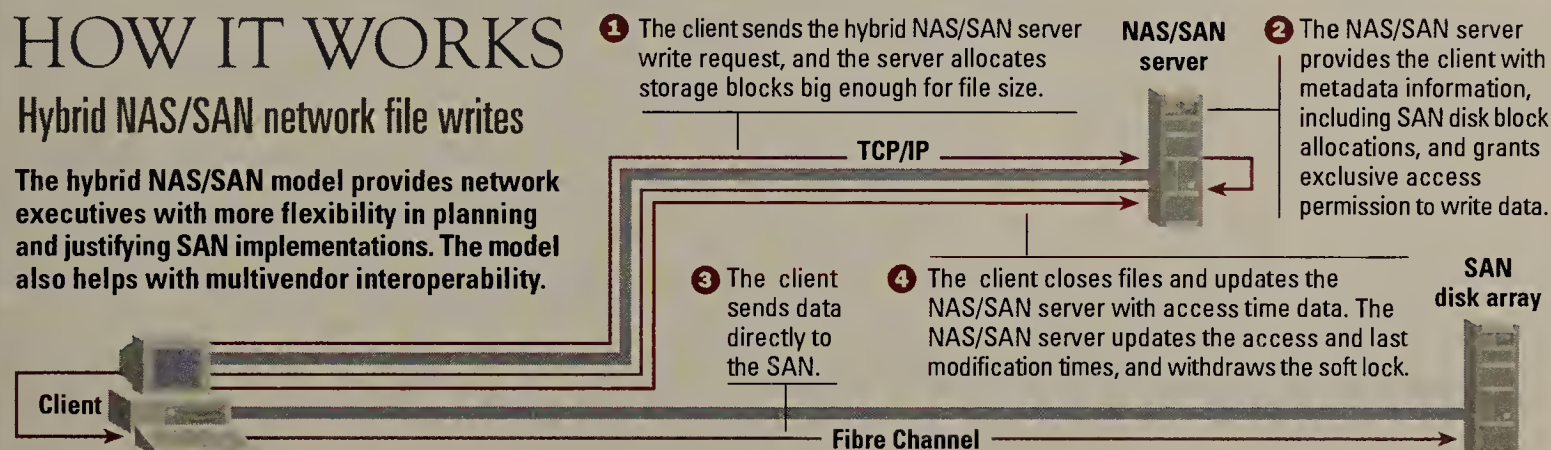
Protocol extensions proposed by the FSWG enable file sharing through the ability to create hybrid NAS/SAN archi-

locking mechanism to manage file system coherency and deal with multiuser contention. The soft lock operates as a file or record lock that can be relinquished for contention-resolution purposes. For example, if one client wishes to write to the same file as a second client, the NAS/SAN server revokes the soft lock given to the first client and takes over the management of write operations using traditional NAS methodologies.

The FSWG's protocol-extension recommendations include the use of a soft lock, as well as four other add-on capabilities to coordinate reads and/or

HOW IT WORKS Hybrid NAS/SAN network file writes

The hybrid NAS/SAN model provides network executives with more flexibility in planning and justifying SAN implementations. The model also helps with multivendor interoperability.



popular because the storage needs of an organization often outpace the capacities of existing systems.

NAS appliances interface with LAN clients through a file-sharing protocol, such as Common Internet File Services (CIFS) for Microsoft, Network File System for Unix or NetWare Core Protocol. The appliances provide the client with directory services, security and the appropriate view and format of the client's data. The NAS device uses an internal operating system, which acts as a control mechanism for managing data storage, semantics and control for reading and writing data onto its disks.

A SAN is a more specialized, alternative strategy for managing growing storage requirements. A SAN is a separate high-speed network (typically Fibre Channel) that connects multiple clients to a high-speed, high-capacity disk array.

SAN-enabled clients use the disk array instead of their internal disk subsystems. However, because SAN storage provides device-level sharing, data stored on the SAN is accessible only by

structures. Such a configuration connects clients to a hybrid NAS/SAN server via TCP/IP and to the SAN disk array via the Fibre Channel Protocol. In such a model, a hybrid NAS/SAN server manages multiuser control information for SAN-stored data, serving as a traffic manager for disk reads and writes, preserving cache coherency for multiuser access and enforcing security semantics. Once the hybrid NAS/SAN server grants access permission, clients connect directly to the SAN disk array for high-speed file data transfer.

Compared with a conventional SAN, the hybrid NAS/SAN server's data control functions involve additional data transfers of data control information. However, the control data exchanges inherently produce low overhead, involving the metadata portions of files. Furthermore, the additional overhead is well justified by the architecture's ability to provide SAN data sharing.

As for dealing with instances in which more than one user wants access to the same data simultaneously, vendors can use the CIFS protocol's soft

writes: disabling NAS-controlled data; preallocating storage; modifying independent and explicit metadata; and identifying disk block allocations (also known as extent lists).

Extending these file-sharing protocols will let vendors deliver SANs that can share data with any authorized client on the network. If clients have a traditional SAN connection, they will retain the advantages of high-speed direct-disk access. If there is contention between SAN clients, NAS-style cache coherency is invoked. If clients are only LAN-connected, they will use the NAS as a conduit for SAN-maintained information.

The hybrid model provides IT with a greater degree of flexibility in planning and justifying SAN implementations, while also facilitating multivendor interoperability.

Smith is the director of marketing at CrosStor Software, a maker of storage software and storage-centric operating systems in South Plainfield, N.J. She can be reached at sue@crosstor.com.

Gearhead — inside the network machine . Mark Gibbs

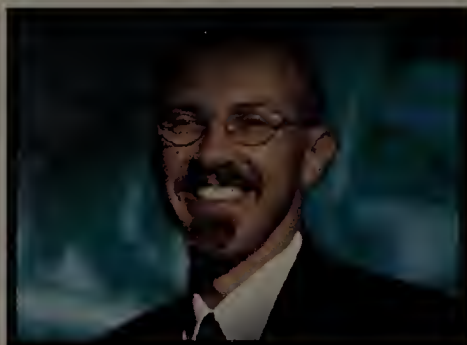
CLIPPING THE WEB SO IT FITS IN THE PALM OF YOUR HAND

Last week, Gearhead enthused about the way-cool 3Com Palm VII with built-in wireless e-mail and Web access. For corporate use, this could be a phenomenal tool to keep mobile users up to date and provide access to corporate resources.

As we discussed, the problem with accessing Web content on the Palm via wireless services is that the average Web page is just a bit overweight for a device with 2M bytes of memory.

Just to make the constraints on the system really tricky, the content display area for HTML pages is only 153 by 144 pixels. Using the normal Palm font, only 11 lines can be displayed at a time. Add to that the limitations of Palm's wireless data transfer rate (8K bit/sec) and the cost of the wireless service, and some serious optimization is required.

3Com's answer is a technology called Web Clipping. Web Clipping defines a Web page variant to ensure that the Palm's memory and communications resources aren't exhausted or otherwise abused. The system consists of the Web Clipping application in Palm VII's (in effect, a Web



browser) and a proxy server that mediates access to Web sites. The Web Clipping system not only supports HTTP access, but also provides secure access using HTTPS.

The process of Web Clipping uses something called Palm Query Applications (PQA). PQAs are applications loaded onto the Palm VII that define how to access a specific Web site. PQAs are easily built: They consist of HTML pages and associated graphics compiled using a utility called the Query Application Builder (this is really easy to use). The HTML content retrieved from the Web and in the PQAs is actually a subset of HTML 3.2 that excludes JavaScript, nested tables, frames, cookies and Java applets.

When you run a PQA (in fact, the PQA is read and interpreted by the Palm VII's Web Clipping application), the initial content you see is local, so there's no associated access cost. The PQA usually also includes the Help and About pages. The index page content is usually structured so you choose a link and go to live information out on the Web.

The only problem with this approach is that if you have new content you want people to see, you need to distribute a new PQA or include the link somewhere in your live content.

There are four special HTML metatags that Web pages need to use to provide Web Clipping-suitable content: The PalmComputingPlatform tag identifies a page as a Palm-friendly page; without this tag, inline images will not be rendered and only the first 1,024 bytes of text will display.

The HistoryListText specifies the name of the page to be displayed in the history pop-up menu, and Palm-LauncherRevision sets the version for a query application.

The metatag LocalIcon is used only

in PQAs and indicates to the Query Application Builder that an image or a Web page is to be stored in the PQA. Content retrieved from the Web can refer to the local content stored in PQAs.

Other Web Clipping features include a cookie-type system; the ability to determine the zip code of the wireless base station the Palm is accessing; and special tags including SMALLSCREENIGNORE, which marks areas in Web content to be removed by the Clipping proxy server so they aren't displayed, and BUTTON, which produces a labeled hyperlink button on the Palm screen.

There are a few more Web Clipping features, but we've covered the major details. What Gearhead really likes about this technology is that it is simple and works well. If you have mobile users, you might think about getting them Palm VII's so you can give them instant and simple access to corporate systems.

If you generate a cool PQA, tell Gearhead about it. E-mail a clip to gh@gibbs.com.



Help Desk

A reader wants to know if there is a limit to how many Windows NT installations you can do on a workstation. He has a support workstation set up with NT on two partitions and tried to add an external hard drive that also has NT running on it. The workstation confused the boot sector, and the reader had to do a partial install to the external drive. Head online to find out what Ron

Nutter recommends.
DocFinder: 4628

DG's quiet buyout

In this week's Water Cooler, Features Editor Neal Weinberg says there wasn't a whole lot of notice taken last month when Data General announced it was being bought out by EMC. But Data General's demise as an independent company marks the end of the minicomputer era in Massachusetts, an era that spawned the term "Massachu-

setts Miracle," made a highway (Route 128) synonymous with high-tech success and even propelled an otherwise unremarkable governor to a Presidential nomination. Find out what companies helped launch the Commonwealth's tech revolution and where they are now.

DocFinder: 4629

Out and about at Interop

It's Interop week, and we've got you covered. Here's what's waiting for you online:

- The latest news from the show floor each day.

DocFinder: 3850

- Reports from the Convergence Showdown, the LAN Switch and Interoperability session, and the Crystal Ball Panel.

DocFinder: 3850

- Our show planner: We've got your week mapped out for you.

DocFinder: 4630

- Our Complete Outsider's

Inside Guide to Atlanta that will help you figure out where to eat and what sights to see.

DocFinder: 4532

Career Doctor

This week, Career Doctor Shaun Kelly offers tips for how to dress for an interview and what to bring. Toting a leather portfolio is good, he says; toting a leather portfolio with someone else's initials is bad, very bad. And leave the umbrellas and cumbersome coats in the car. You'll end up forgetting them at the interview anyway and will have to retrieve them later.

DocFinder: 4631

IBM-Cisco forum

Our forum, "Good-bye to IBM's Network Hardware Division" still has readers fired up. One reader says lamenting the demise is fruitless. "Let's cut out all the nice chitchat," he writes. "IBM has been slowly and systematic-

ly killing NHD for the past five years. It's an absolute credit to the NHD developers and some of the NHD technical people that NHD survived as long as it did . . . If IBM didn't want NHD, then it should, at the very least, have spun the group off . . . But to simply take some money from a competitor and, in return, be taken out of the market is a pathetic ending to a great division." Read what others are saying, and add your own comments.

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Editorial Insights

www.bestsites.com — or is that worstsite.com?

www.cisco.com
www.lotus.com
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www.novell.com

What happens when you read this short list of vendor URLs? Are you confident you will be able to walk in the front door and quickly and easily find the information you need? Or does the prospect of hunting through one of these sites send a wave of anxiety crashing down on you?

We've all been using the Web long enough to know that one of the above experiences is just as likely as the other. Some sites stink when it comes to providing visitors the information or features they are seeking. Others are great at it. Need new product information? It's at your fingertips. Need the latest patches and updates? Downloads are a snap. Want to buy a product? Transactions couldn't be easier.

What we want to know is which vendor Web sites you think fall into which category and, of course, why. Does Microsoft's site fall into the "best" category because it's so deep, so full of information? Or does the site's depth make it overwhelming and difficult to peruse, pushing it into the "worst" category?

We know the issue of which network vendor has the best Web site is sure to be contentious, and that's why we're asking for your help. You're out there digging through these sites daily. You recognize their weaknesses and strengths. So we hope you'll share your experiences with us. All you have to do is complete our "Best Vendor Web Site" survey running on Network World Fusion now. To get to the survey, go to www.nwfusion.com and type in DocFinder: 4632.

We'll provide the survey results as part of our inaugural Best Issue, a Signature Series edition coming Nov. 15. But our examination of vendor Web sites won't stop there. We've also asked Customer Insites, a Web usability testing firm, to evaluate some of your top choices.

Overall, we think the package will provide you with a sense of which network vendors are doing a good job and which are not. And we think you'll be able to use the information to get better use out of already great sites or to push vendors of the not-so-great sites to get their acts together. So head online to our survey. We're waiting for your input.

— Beth Schultz
Executive editor, Signature Series
bschultz@nwfusion.com

Message Queue

POLICY NO PANACEA

There has been a lot of press lately concerning policy-based networking ("Policy-based networks: Easier said than done," Aug. 23, page 48). While at first glance policy-based networking seems an elegant strategy, three issues make me doubt it will ever live up to its hype.

The first issue is technological. Policy-based networking is still basically vaporware. While capabilities such as TCP port prioritization and voice prioritization are available today, the hardware and software mechanisms that would enable more granular features such as application and user prioritization have not been standardized and, where available, are usually proprietary. If policy-based networking is to be useful, especially in a global network, there must be standards that will allow the prioritization information to be carried across multivendor IP/ATM networks.

The second issue is philosophical. The network is a utility. Businesses are not built for networks, rather networks are built for businesses. Policy-based networking appears to put the cart before the horse. To implement it fully, you need to create corporatewide criteria on how applications and users are to be prioritized. These directions need to be made at a corporate level, with input and cooperation from all business units. This is a rather daunting task that will require time and involve a lot of discussion and consensus. In some cases, business processes might need to be reengineered. At this point, the network stops being a utility and tries to assume a higher role. What policy-based networking is saying is that the network can't meet the business need, so you need to redo the business.

The third and most important issue is with implementation. You cannot just install a policy-based network. Business decisions have to be made, processes put into place, new equipment purchased and integrated into the network, and the current network management structure fine-tuned. This will require in most cases a major project with associated tasks, resources, personnel and time lines.

It is conceivable that implementing policy-based networking may turn out to be more complex than

implementing a network management framework such as CA Unicenter, HP OpenView or IBM Tivoli. Gartner Group reported an approximate 70% failure rate for implementations of these products due to their size, cost and complexity — and the majority of these implementations didn't require any consensus or major input from anyone other than IS. With the companywide input, processes and tasks required for policy-based networking, I don't see its success rate being any better.

I realize there may be a time when I will need policy-based networking. If dense wave division multiplexing, terabit routing, Gigabit Ethernet, virtual LANs and trunking don't meet the bandwidth needs of the company, then I will have to look at policy-based networking. However, it's not something I'm looking forward to.

Charles Yoke
Manager, technology architecture
Janus
Denver

COMPLIANT FIREWALL

John Curtis' column "IPSec's double-edged security" (Aug. 23, page 24) leaves readers with the impression that IPSec virtual private network (VPN) security and application firewalls are mutually exclusive. This is not true. Case in point: Axent Technologies' Raptor Firewall, an application firewall, is also an IPSec-compliant product that establishes VPN tunnels to other IPSec-compliant equipment. As with all IPSec-compliant products, it will negotiate services with security associations, or what Curtis refers to as end points.

Furthermore, the product can decrypt datagrams and optionally pass them up the IP stack to the service proxies, which will match them to their associated application service. If the rule allows access from the requesting client, the data will be allowed to pass on to the secure host. Raptor Firewall also supports dynamic key exchanges as part of the IPSec VPN standard.

Peter Wilford
Technical sales engineer
Axent Technologies
Rockville, Md.

Send letters to nwnews@nwfusion.com or John Gallant, editorial director, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.

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ACTIVE DIRECTORY: GREAT LEAP FORWARD OR LONG MARCH?

As the countdown to Microsoft's Windows 2000 release continues, it's time to begin your Active Directory migration planning.

With features enabling single sign-on, improved roaming and remote administration, delegated administration, standards support and richer APIs, Active Directory represents a great leap forward from NT. But despite extensive beta testing, much remains unknown. How big can domains get? What reliability and performance levels will users see? Where will the cross-platform interoperability "gotchas" lie?

Active Directory can offer real business value and some long-term savings. If your existing NT environment is disorganized and unstable, return on investment (ROI) may come soon. But if your network is widely distributed with weak WAN links and old gear on the desktop, Active Directory will be more expensive to deploy.

In all cases, it's important to set Windows 2000 guidelines soon. Otherwise, you may fall victim to bottom-up deployment as internal users begin deploying Windows 2000 without you, creating incongruous

namespaces and inconsistent security practices that will be hard to change later.

To estimate ROI and provide guidance, you'll need an Active Directory architecture that includes namespace and schema design, domain controller topology, security policies and administration conventions. Develop these in concert with overall enterprise network, desktop, server, Domain Name System, directory, security and other co-dependent enterprise architecture threads.

Then put together a migration plan. There are two basic methodologies: in-place migration and domain restructuring migration. In-place migration moves NT domains "as is" into Windows 2000. Domain restructuring lets you clean up the mess first, consolidating and throwing out unnecessary NT domains. However, domain restructuring requires massive changes to NT security IDs and access control lists during the move, so it's riskier and requires sophisticated tools. Pay now or pay later, the choice is yours.

Microsoft will provide a Domain Migration snap-in



for Web download concurrent with the Windows 2000 release; that may be enough for your domain restructuring needs. But if you need extensive premigration housecleaning, highly customized procedures or complex post-migration coexistence, consider third-party offerings from vendors such as Entevo and FastLane Technologies.

Many questions surround the migration effort, including what are the pitfalls, when should you start, how will you get there and who should you partner with. Build in plenty of time, budget for planning and get up to speed as soon as possible. Check out the white papers on www.microsoft.com/windows/server/Overview/exploring/directory.asp. Arm yourself with plenty of information as the long march to Windows 2000 begins.

Blum is senior vice president and principal consultant with The Burton Group, an IT advisory service. His book Understanding Microsoft Active Directory Services will be published this fall. He can be reached at dblum@tbgroup.com.

On Security . Winn Schwartau

HACTIVISTS' CYBERDISOBEDIENCE IS ANYTHING BUT CIVIL

In 1994, I wrote an editorial warning that cybercivil disobedience would soon become a tool of the politically disaffected. The article ended with the statement, "The Clinton administration should keep in mind that for an information age population to aggressively voice its discontent, America doesn't have to take to the streets." The British recently

discovered how pre-scient this warning was.

On June 18, a physical street demonstration in London was accompanied by an electronic demonstration apparently organized by the likes of The



Animal Liberation Front, antinuclear protesters and pro-democracy groups opposed to the Chinese government. The groups have already infiltrated several important Web sites, according to the U.K.'s National Criminal Intelligence Service.

Of specific concern, though, is that several organizations, including the London Stock Exchange and Barclays Bank, were targeted during the anticapitalist demonstration by teams of hackers from Indonesia, Israel, Germany, Canada and the U.S. For five hours, at least 20 companies were subjected to more than 10,000 hacker attacks.

This technique is called Floodnet, after a legal software program that initiates a large number of Web searches every second. Multiply this by tens of thousands of people coordinating their searches to constantly occur over a period of hours, and you find yourself under a distributed denial-of-ser-

vice attack.

Many cybercivil disobedience methods such as Floodnet were pioneered by the Electronic Disruption Theater (EDT), a group of cyberartists that has conducted its own electronic demonstrations in

support of the Zapatista movement in Mexico. The EDT was the group that launched a pre-announced demonstration at a Pentagon Web site — an event that caused Pentagon administrators to respond with a controversial and legally questionable counterstrike. (For more on this incident, go to www.nwfusion.com/news/0111vigilante.html.)

Floodnet attacks are disruptive, not destructive in the classic

sense of the word. But an online business that becomes the victim of an assault or electronic demonstration would argue that disruptive activities are destructive to its income. Maybe that's the whole point. I've talked with EDT member Ricardo Dominguez, and from where I stand, he is a political dissident, not a hacker with an attitude of technical supremacy; he merely wants to make political statements.

How can you defend your company against Floodnet-like attacks? Here are some tips:

- Set an upper limit on the number of concurrent searches permitted in a given time period. This is a pure performance issue that you have hopefully already considered.

- Restrict the number of Web searches that can be successfully initiated from a specific browser or IP client in a given time period. It is not normal for a surfer to launch a dozen searches per second; one search every 10 or 20 seconds is more reasonable.

- Restrict repetitive same-criteria searches. Legitimate surfers conduct multiple searches on different criteria most of the time.

- Establish a means to locally sever a connection made by a Floodnet user.

- Consider using products with strike-back capabilities. For example, in response to attacks, Secure Computing's Sidewinder firewall launches a daemon that will trigger the offensive techniques of your choice. Strike-back products from other vendors are in the works.

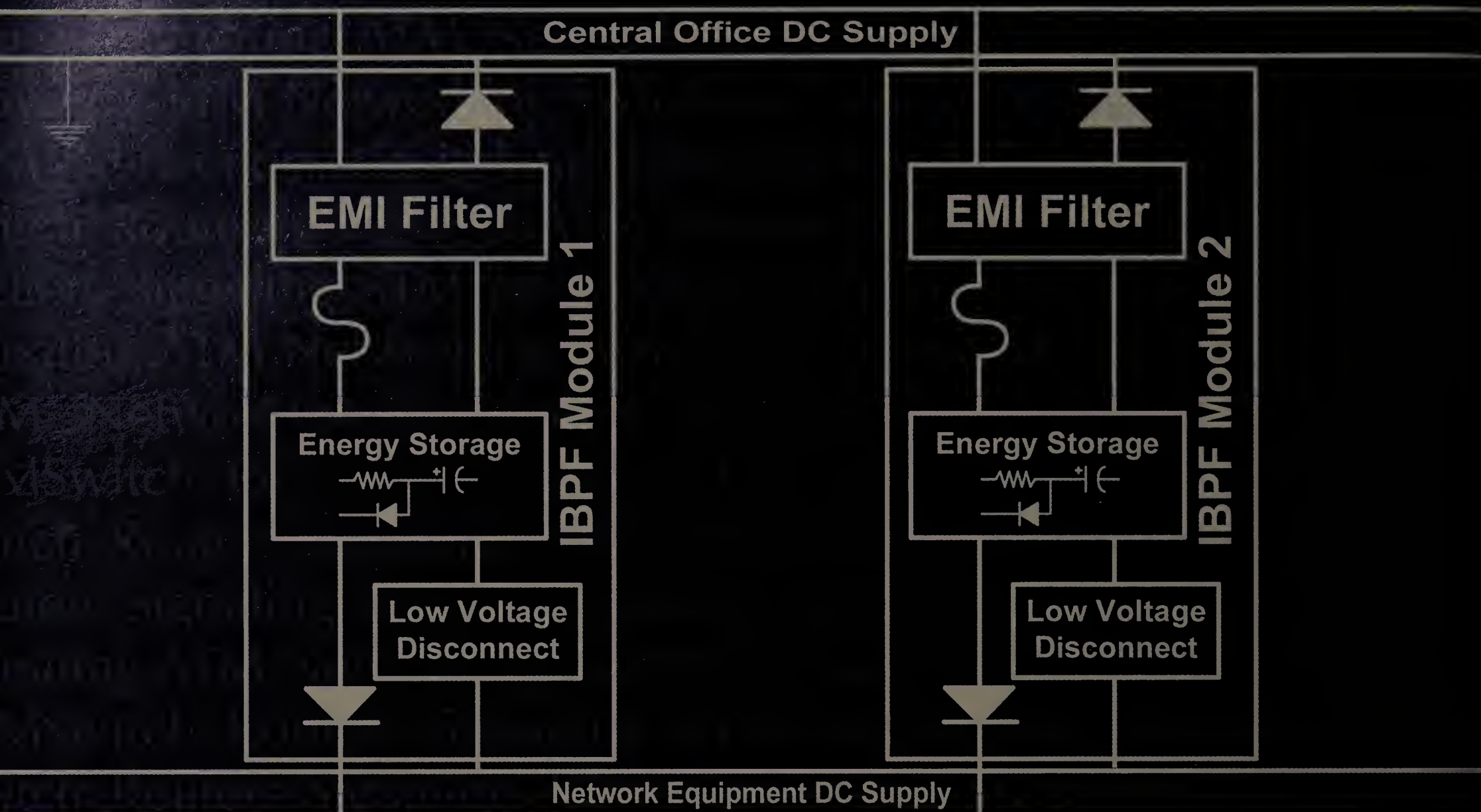
Hactivism has reached a new plateau: an online listserv has been created that discusses the politics and methods to best accomplish hactivists' goals. To get on the list, send e-mail to hactivism-request@lists.tao.ca and enter the word "subscribe" in the text body. Make sure you have no subject line and remove your signature. Alternately, subscribe at <http://lists.tao.ca>. Use the list to be forewarned of attacks, targets and methods.

Then again, participation is a good option, too. If you disagree with what the hactivists have to say, argue with them. Listen closely, and be warned that high-profile firms, organizations and groups are the most likely targets of hactivists.

Schwartau is chief operating officer at The Security Experts and president of InfoWar.com, both in Seminole, Fla. He can be reached at winn@securityexperts.com or winn@infowar.com.



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NETWORK MANAGEMENT

platforms make the grade

The 1999 Network Management Survey shows that Cabletron Spectrum Enterprise Manager has the edge in customer satisfaction.

BY SUSAN ELLERIN

While there are a lot of benefits to using network management platforms, no product is perfect.

Just ask Vanderbilt University, which slashed its network downtime by installing Cabletron Spectrum Enterprise Manager. Instead of getting phone calls from angry users half an hour after a problem starts, network managers now get pages from the software within 3 or 4 minutes, says John Brassil, network engineer at Vanderbilt in Nashville.

"It's really been a lifesaver in terms of 24-7 notification of our engineering staff," he says.

The downside is that Spectrum doesn't have the richest support for non-Cabletron hardware — and getting the software up and running was no easy task, Brassil says. "Spectrum has a stack of manuals about 2-feet high. It's pretty intimidating," he says.

Such mixed evaluations are typical for management software these days. The 1999 Network World Network Management Survey results show that you're

generally content with your arsenal of network management tools, although no product really stands tall above all others.

While there are no overwhelming victories, survey results still identify leaders and laggards. Cabletron Spectrum Enterprise Manager is tops for enterprise management, while Computer Associates Unicenter TNG leaves the most room for improvement.

On the LAN management front, the Hewlett-Packard OpenView family garnered the highest satisfaction ratings, while Seagate Desktop Management Suite came in at the back of the pack.

Those are just a few highlights from the survey we conducted to see how you grade the leading network management platforms. The ratings focus on four key aspects of a management platform — scalability, integration, management capabilities and overall value. Moreover, we asked respondents for a bottom-line indication of their overall satisfaction with the network management tools they use.

Our rating scale ranges from a low of 60 (not at all satisfied) to a high of 100 (extremely satisfied). A score of 90 or greater counts as an A; 80 to 89 a B; 70 to 79 a C; and 60 to 69 a D. Products earning overall satisfaction scores of 85 or above merit a place in our Honor Roll.

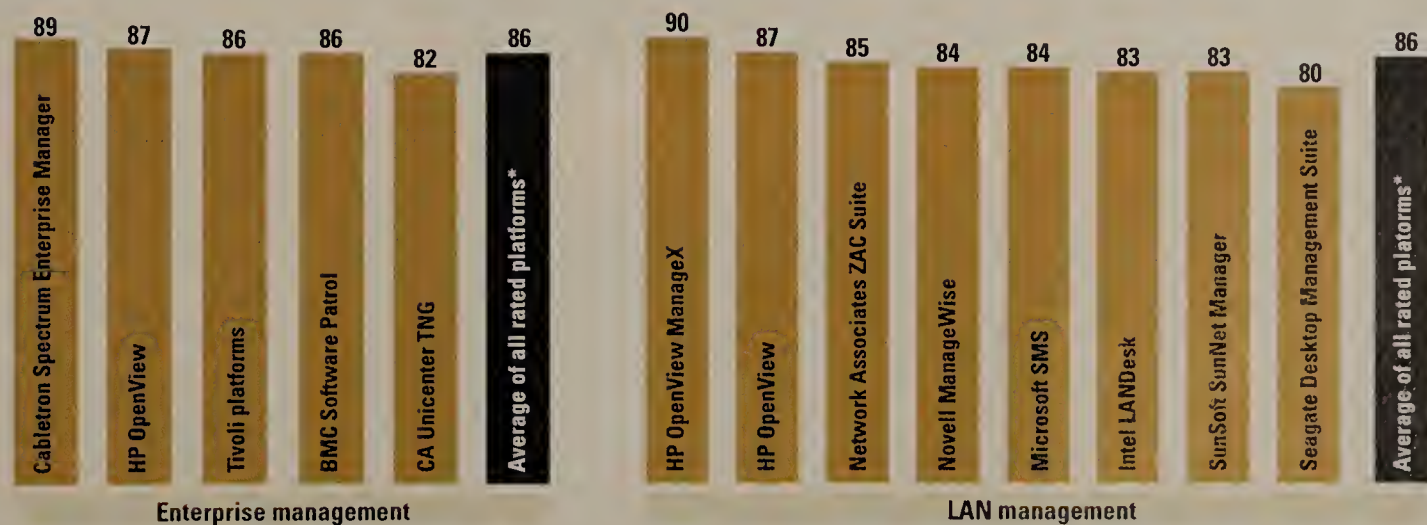
We divided the results into two general types of management tools — enterprise management and LAN management. While the areas occasionally overlap, one common distinction is scale. The bulk of the companies with small networks represented in the survey rely solely on LAN management platforms, while the firms with the most networked clients are more likely

Continued on page 76

How the platforms stack up

High grades for overall satisfaction put Cabletron Spectrum Enterprise Manager and HP OpenView ManageX at the head of the class.

* Includes products for which we didn't have enough responses to rate individually.



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Continued from page 73

to use enterprise management tools or both types of products.

Enterprise achievers

Cabletron Spectrum Enterprise Manager is clearly at the head of the class of management products. The product has top marks for all key satisfaction categories. Customers are most impressed with Spectrum's scalability, giving it an A grade of 90 (see graphic, right).

HP OpenView came in second for overall value, though the product matches Spectrum point for point in integration capabilities.

While BMC Software Patrol and Tivoli platforms tied for overall satisfaction and management capabilities, Patrol bested Tivoli in scalability, integration and overall value. (The Tivoli rating includes Tivoli Management Framework and NetView for OS/390 because too few survey respondents use either product to characterize them separately.)

CA Unicenter TNG lagged behind its competitors in every category except for scalability. The product's lowest grade was an 81 for overall value.

Indeed, many users are stunned by the cost of the largest enterprise platforms, says Ron Gallagher, president of Oust Consulting, a firm in Paradise Valley, Ariz., that helps companies outsource their IT services. "The price tends to put them off," he says. Because the products can take a lot of effort to install and use, "even if companies have platforms, they're not effectively using them," Gallagher says.

Perhaps that's one reason why Unicenter and Tivoli platforms scored relatively low for integration with other management tools, which is somewhat surprising given that both vendors market their products as management frameworks.

LAN leaders

A look at the LAN management ratings shows that other vendors can learn a thing or two about customer satisfaction from HP. HP OpenView ManageX was the only platform in the survey to earn an A for overall satisfaction, and its sibling HP OpenView also received high marks.

Network professionals viewed OpenView ManageX and OpenView's scalability and integration with other management tools as especially superior, which might be one reason why some of you use the platform to manage your entire enterprise.

On the other hand, the scalability features of Intel LANDesk and Network Associates' ZAC Suite left the most room for improvement. However, ZAC Suite scored a relatively high 87 for management capabilities.

Microsoft Systems Management Suite (SMS) and Novell ManageWise users rated both products the same in terms of overall satisfaction. SMS had the edge when it came to scalability, while ManageWise boasted higher scores for integration and overall value. In fact, SMS offers among the poorest integration of the products featured in the survey, along with Seagate Desktop Management Suite.

As you might expect, our analysis of the survey results shows that scalability, integration, management capabilities and overall value are closely tied to overall satisfaction.

But if vendors were to concentrate on improving just one aspect of their products, it would be wise for them to focus on overall value. This factor is the single biggest determinant of satisfaction and has a predictive strength of 72%. Put another way, if you know a product's rating for overall value, 72% of the time you'll be able to predict the product's overall satisfaction rating.

Platform scalability and management capabilities are strong predictors of overall satisfaction, too, and have individual predictive strengths of near 60%. Finally, a management tool's integration capabilities are still important, but this rating has the least impact on overall satisfaction.

Zeroing in on the details

The core ratings reflect the opinions of all respondents who use a particular product. However, the people who use a tool as their primary management platform can generally provide a more thorough evaluation of its capabilities, so we asked them to judge more than a dozen addition-

Vendor report cards

Here's how respondents rate the key attributes of the tools you use for enterprise and LAN management.

Enterprise management

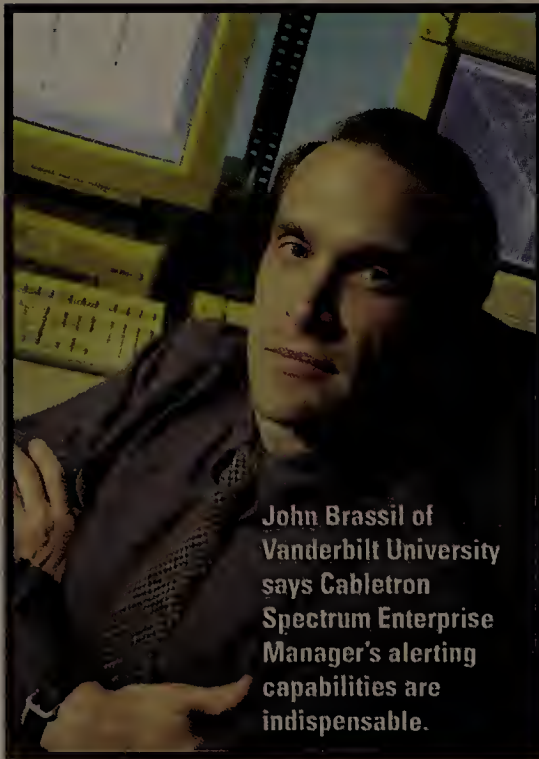
	Scalability	Integration	Management capabilities	Overall value
Cabletron Spectrum Enterprise Manager	90	87	89	89
HP OpenView	88	87	88	87
BMC Software Patrol	88	86	88	87
Tivoli platforms	87	85	88	85
CA Unicenter TNG	86	84	86	81
Average of all rated platforms*	88	86	88	86

* Includes products for which we didn't have enough responses to rate individually.

LAN management

	Scalability	Integration	Management capabilities	Overall value
HP OpenView ManageX	88	89	88	89
HP OpenView	87	87	88	86
Network Associates ZAC Suite	83	81	87	84
Novell ManageWise	84	83	85	85
Microsoft SMS	85	80	85	84
Intel LANDesk	83	83	85	84
SunSoft SunNet Manager	86	83	85	83
Seagate Desktop Management Suite	84	80	86	81
Average of all rated platforms*	86	84	87	86

* Includes products for which we didn't have enough responses to rate individually.



John Brassil of Vanderbilt University says Cabletron Spectrum Enterprise Manager's alerting capabilities are indispensable.

Online



- Access the complete set of detailed satisfaction ratings for major enterprise and LAN management platforms.
- Check out the demographics of the people who participated in this survey.
- Sign up for our twice-weekly newsletter on network/systems management.

al product attributes. The most noteworthy results are shown in the graphic (page 78), while the rest can be found on Network World Fusion.

Already the leader among general users, Spectrum also takes the prize for keeping its primary users happy. The product matches or surpasses the competition in nearly all categories.

Spectrum particularly distinguishes itself with a 92 for performance management and also earns an A for scalability, management capabilities and configuration management. Likewise, the platform excels in problem management, network optimization capabilities, systems optimization, automated diagnosis and alert correlation capabilities.

One key ability for network managers is alert correlation. Spectrum earns high marks in part because it can look at a list of network events and errors, and pick out which ones caused all the rest.

"With its fault-isolation engine, Spectrum is able to identify what problems there are, as opposed to just turning all the devices that are affected red" on the screen, says Dan Speers, senior network engineer at investment bank Jefferies & Co. in New York.

Spectrum also can weed out small problems. "Sometimes routers send a 'link down' trap, and by the time you get to the router, the link is back up," Speers says. Spectrum waits a while before paging a network manager to make sure the link is indeed down for the count and requires a manager's intervention.

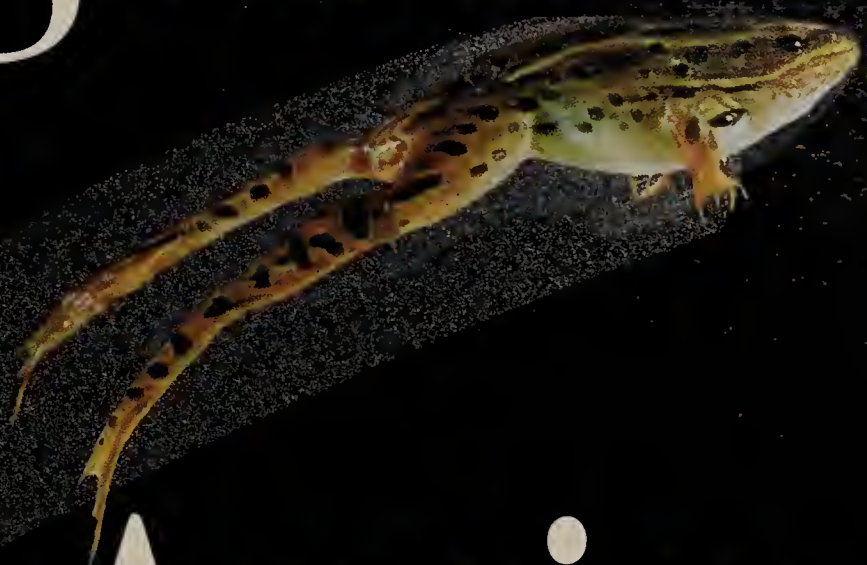
Tivoli platforms do well, too, tying with Spectrum for an 89 in overall satisfaction. Tivoli offers seemingly better overall value, asset/inventory management, backup management and database management.

Primary users of CA Unicenter TNG aren't quite as pleased. In fact, the product ranks below its competitors in every factor evaluated. Users identified its biggest weaknesses as asset/inventory management and directory integration.

BMC Software Patrol isn't included in the detailed ratings because too few survey respondents use the product. And when it comes to LAN management, almost 75% of you use HP OpenView, Microsoft SMS or

Continued on page 78

Guess who's
leapfrogged the
industry.



Again.



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Continued from page 76

Novell ManageWise as your primary LAN management platform. Because less than 5% of respondents primarily use any other tool, we can only provide in-depth analysis of the leading platforms.

OpenView beats SMS in most categories, and its users are especially pleased with the platform's integration features, problem management and automated diagnosis. Conversely, OpenView customers would likely welcome improvement in the areas of directory integration and software distribution.

SMS' strengths are asset/inventory management and software distribution, but the product is tarnished with the lowest score of the survey, 78, for automated corrective actions. Moreover, SMS could stand to improve its automated diagnosis capabilities.

ManageWise pulls away from the pack in terms of server management and directory integration. The Novell platform's most apparent weakness is Web server management.

Repeat customers

Would you buy your network management platform again if given the chance? Roughly 75% of respondents say they would if they had it to do over. This decision is unrelated to how much the product cost, how long it took to install or when it was purchased. Naturally, the answer is consistent with overall customer satisfaction.

Four areas of satisfaction most drive the inclination to purchase management platforms again: problem management, systems optimization, asset inventory management and configuration management. Survey respondents who say they wouldn't purchase the same platform again are significantly less satisfied with these functions of their products.

Not surprisingly, Spectrum is the enterprise management platform that most users would buy again (see graphic, lower right). Tivoli is in second place but doesn't even come close to touching Spectrum's edge with customers.

The LAN management race is much closer. The largest proportion of HP OpenView users have no regrets about their purchasing decisions, followed by SMS and ManageWise.

Then again, some respondents didn't have to buy network management tools in the first place. Freeware tools aren't included in the survey, but one user says his organization depends on two free tools, Multi Router Traffic Grapher (MRTG) and Big Brother. The organization, which has points of presence scattered around the county, found platforms such as NetView and OpenView too cumbersome.

MRTG helps spot bottlenecks and capacity problems, while Big Brother watches processes and systems to make sure they're up and running, says Terry Moenich, general manager of the Wood County Internet Council in Ohio.

"Those are our two main tools that we live and die by, and the odd thing is that they're free," Moenich says.

Ellerin is president of STAT Resources, a strategic research and consulting firm in Boston. STAT can be reached at www.stat-resources.com. Jeff Caruso, a Network World senior editor, and Lynne Castronuovo, research manager of STAT, also contributed to this story.

SURVEY METHODOLOGY

Boston-based strategic marketing firm STAT Resources conducted the 1999 Network World Network Management Survey. STAT mailed surveys to a random sample of 1,500 *Network World* readers.

To ensure that we reached enough users of major network management products, STAT supplemented the mail survey data with telephone interviews with a randomly selected group of readers.

This process yielded a representative sample of 283 subscribers who were qual-

ified to speak about their company's use and satisfaction with enterprise or LAN management platforms, or both.

The typical respondent has more than 5,000 clients installed on-site and almost 18,000 in the entire organization. One-quarter of the respondents work for non-profit organizations, while the rest are employed in a range of industries.

Respondents who work in the profit sector reported gross 1998 corporate revenue of more than \$11 billion on average.

DISTINGUISHING FEATURES

Respondents' ratings of their primary management platforms point to various strengths and weaknesses. Product attributes with the most significant differences between vendors are shown here.

Enterprise management

	Cabletron Spectrum Enterprise Manager	Tivoli platforms	HP OpenView	CA Unicenter TNG	Average of all rated platforms*
Overall value	89	90	87	83	86
Asset/inventory management	85	88	83	80	82
Backup management	84	87	83	81	83
Configuration management	90	86	85	84	85
Database management	86	87	82	81	82
Performance management	92	85	86	84	86
Problem management	91	88	87	84	87
Security management	89	87	84	83	85
Network optimization capabilities	91	85	85	83	86
Systems optimization	91	84	84	83	84
Automated diagnosis	91	84	84	83	85
Automated corrective actions	88	82	82	81	83
Alert correlation capabilities	90	87	85	85	86
Directory integration	89	82	82	80	83
Overall satisfaction	89	89	87	83	87

* Includes products for which we didn't have enough responses to rate individually.

LAN management

	HP OpenView	Microsoft SMS	Novell ManageWise	Average of all rated platforms*
Scalability	88	86	86	87
Integration with other management tools	88	82	85	85
Asset/inventory management	81	83	81	84
Problem management	86	84	83	84
Software distribution	83	85	84	83
Server management	85	84	84	84
Network optimization capabilities	85	83	85	84
Automated diagnosis	85	80	82	82
Alert correlation capabilities	85	83	82	84
Directory integration	82	83	82	80

* Includes products for which we didn't have enough responses to rate individually.

SECOND THOUGHTS

If they had it to do over, the majority of users say they would purchase their network management platforms again. Cabletron Spectrum Enterprise Manager and SunSoft SunNet Manager inspire the most loyalty among their customers.

Enterprise management

Cabletron Spectrum Enterprise Manager	
BMC Software Patrol	71%
Tivoli platforms	70%
HP OpenView	69%
CA Unicenter TNG	65%

LAN management

SunSoft SunNet Manager	90%
Intel LANDesk	89%
HP OpenView ManageX	88%
HP OpenView	86%
Microsoft SMS	79%
Novell ManageWise	69%
Network Associates ZAC Suite	67%
Seagate Desktop Management Suite	50%

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SWITCH VENDORS *pass* interoperability TESTS

We put Gigabit Ethernet switches from seven vendors through their paces. For the most part, the products worked well together.

BY ANN SULLIVAN

It was billed as a test of Gigabit Ethernet switch interoperability, and the seven vendors that participated not only scored generally high marks for their Layer 2 and Layer 3 hardware, but they also got into the spirit of the event.

The fierce competitors set aside their rivalries last month to help each other during the test, which was conducted by The Tolly Group and *Network World* at a hotel in New Jersey. Take Lucent's Jeff Tabor, for example. Even when Lucent's boxes weren't being tested, Tabor could be found moving switches, swapping cabling and helping get Ethernet switch pairs up and running.

And he wasn't the only one pitching in. Engineers from Hewlett-Packard and Foundry Networks were helping out each other. Nortel Networks was collaborating with Cabletron. There was Cisco breaking out its new enhanced spanning tree feature in front of IBM, Lucent and others.

Of course, in interoperability tests, one vendor's performance depends on another's, so cooperation among the engineers was something of a requirement. Still, one doesn't see that sort of camaraderie in a typical switch shootout in which vendors work one-on-one with testers. The need to work together created a cordial atmosphere at the Newark hotel suite where The Tolly Group set up camp and began evaluating the five Layer 2 switches and seven Layer 3 switches. And that cooperative spirit helped shave a day off the five-day testing schedule, which included four mandatory and six optional tests.

In general, the interoperability test results were encouraging. When the seven vendors said they followed a standard, most did — and they didn't deviate

from the standards so much that interoperability suffered. For customers, this means you can mix and match vendors depending on your deployment needs. All the switches will negotiate speed and duplex settings to maximize throughput, and the Layer 3 switches will be able to communicate over different protocol networks. Most of the Layer 3 devices showed they can back each other up if one fails — after all, the last thing you want to find out in a crisis is that your switches are only interoperable under optimal working conditions.

The test plan

Test 1: Autonegotiation (mandatory)

Description: Each pair of switches must properly negotiate the highest speed and duplex settings common to both devices.

Degree of difficulty: Low

Participants: All (Cabletron's SmartSwitch 6000 and SmartSwitch Router 8600; Cisco's Catalyst 2948G and Catalyst 8510; Foundry's BigIron 4000; Hewlett-Packard's ProCurve Switch 4000M and ProCurve Routing Switch 9304M; IBM's 8275-416 Ethernet Switch and 8371 Multilayer Ethernet Switch; Lucent's Cajun P120 Workgroup Switch and Cajun P550 Gigabit Switch; and Nortel's Accelar 1200)

Results: All 12 products passed.

To warm up the players, we started with autonegotiation drills — an easy win for any vendor serious about interoperability. After first verifying that each switch was properly configured to autonegotiate, we recorded the setting that each switch reported to have negotiated, compared that to the maximum configuration supported by both devices, and confirmed that throughput remained within an appropriate range as we transmitted a stream of 1,518-byte packets from



The Tolly Group's red-shirted duo of Scott Hamilton (left) and Greg Kilmartin work with Cisco's Harriet Jarvis and Cabletron's John Pappas to keep their switches talking.

Netcom Systems' SmartBits to each switch.

We expected all the boxes to pass, and they did. Most consumers today take autonegotiation for granted, and it's good to know these boxes take autonegotiation in stride.

Test 2: Flow control (mandatory)

Description: Each switch pair must exchange flow control information.

Degree of difficulty: Moderate

Participants: All except IBM's 8371 Multilayer Ethernet Switch

Results: Varied

This test caused considerable consternation among the participants because every switch vendor handles congestion differently. We knew that, but we pressed on anyway.

Specifically, we set out to verify the initiation and reception of flow control messages, though the IEEE's

802.3x standard for flow control over Fast Ethernet and Gigabit Ethernet only requires a switch to respond to flow control messages, not initiate them (see story, page 82). We wanted to determine how each switch acts upon receiving a control message — whether a switch passes along the message, throttles back traffic or modifies traffic on a port-by-port basis. Different implementation strategies yield different results, even though they may all be considered standard-compliant.

Working with pairs of switches and a high-speed uplink, we deliberately generated congestion at one switch's output port and watched to see if that switch initiated a flow control message to the other switch. We then queried the receiving switch to see if it received the control message. Using network analyzers — Network Associates' Sniffer Pro High-Speed for the gigabit links and Wavetek Wandel Goltermann's DominoFE for the Fast Ethernet links — we verified whether traffic flow from the switch that got the pause message was reduced until congestion was clear. We performed the tests in both directions with each pair.

Four switches passed with flying colors — Lucent's Cajun P120 Workgroup Switch and Cajun P550 Gigabit Switch, and IBM's 8275-416 Ethernet Switch and HP's ProCurve Switch 4000M. Some products responded to pause messages but didn't initiate them — which is acceptable according to the IEEE standard. These are: Cabletron's SmartSwitch 6000 and SmartSwitch Router 8600; Cisco's Catalyst 2948G and Catalyst 8510; and Nortel's Accelar 1200.

Only Foundry's BigIron 4000 and HP's ProCurve Routing Switch 9304M (a Foundry BigIron 4000 switch that HP resells through an OEM agreement) neither initiated nor responded to pause messages. IBM's 8371 Multilayer Ethernet Switch doesn't support the standard, but the company says flow control will be supported in the product's next release late this year.

Test 3: IP routing (mandatory)

Description: Each switch pair must properly route TCP/IP traffic.

Degree of difficulty:

Low

Participants: Layer 3 switches

(Cabletron's SmartSwitch Router 8600; Cisco's Catalyst 8510; Foundry's BigIron 4000; HP's ProCurve Routing Switch 9304M; IBM's 8371 Multilayer Ethernet Switch; Lucent's Cajun P550 Gigabit Switch; and Nortel's Accelar 1200)

Results: All participants passed.

To verify IP routing interoperability, the visiting engineers configured each Layer 3 switch

with static routes or a default gateway, and we paired each switch with the other participants. We required the devices to communicate with one another over two different IP networks — one "backbone" network and one "private" network — using TCP/IP.

As in our autonegotiation tests, we weren't expecting much trouble from those who claim to support the standards. True to form, the seven Layer 3 switches passed the IP routing tests.

Test 4: IP Routing Information Protocol (RIP) Versions 1.0 (mandatory) and 2.0 (optional)

Description: Each switch pair must exchange IP routing table information in compliance with RIP Version 1.0 and, optionally, Version 2.0.

Degree of difficulty: Low

Participants: Layer 3 switches

Interoperability report card

Vendors may not talk, but their switches do

Layer 2 devices

Cabletron's SmartSwitch 6000

Cisco's Catalyst 2948G

HP's ProCurve Switch 4000M

IBM's 8275-416 Ethernet Switch

Lucent's Cajun P120 Workgroup Switch

Layer 3 devices

Cabletron's SmartSwitch Router 8600

Cisco's Catalyst 8510

Foundry Networks' BigIron 4000

HP's ProCurve Routing Switch 9304M

IBM's 8371 Multilayer Ethernet Switch

Lucent's Cajun P550 Gigabit Switch

Nortel's Accelar 1200

	Autonegotiation	Flow control	IP routing	IP RIP v1.0, v2.0	IPX routing	Link aggregation	Accelerated convergence	Stand-by routing protocol	Gigabit Ethernet uplink	
Cabletron's SmartSwitch 6000	●	●*	U	U	U	U	●	NT	NT	●
Cisco's Catalyst 2948G	●	●*	U	U	U	U	●	●	NT	●
HP's ProCurve Switch 4000M	●	●	U	U	U	U	●	NT	NT	●
IBM's 8275-416 Ethernet Switch	●	●	U	U	U	U	●	NT	NT	U
Lucent's Cajun P120 Workgroup Switch	●	●	U	U	U	U	●	NT	NT	●
Cabletron's SmartSwitch Router 8600	●	●*	●	●	●	●	●	NT	●	●
Cisco's Catalyst 8510	●	●*	●	●	●	●	●	NT	NT	●
Foundry Networks' BigIron 4000	●	F	●	●	U	●	●	NT	●	●
HP's ProCurve Routing Switch 9304M	●	F	●	●	U	●	●	NT	●	●
IBM's 8371 Multilayer Ethernet Switch	●	U	●	●	●	●	●	NT	●	U
Lucent's Cajun P550 Gigabit Switch	●	●	●	●	●	●	●	NT	●	●
Nortel's Accelar 1200	●	●*	●	●	●	●	●	●	●	●

● Pass

F Fail

U Unsupported

NT Not tested

* Responds to but doesn't initiate flow control messages

Results: All participants passed.

To verify compatibility using IP RIP Version 1.0 and 2.0, the participants didn't configure their switches with static route entries but instead allowed the switches to build dynamic routing tables based on exchanged RIP information. We required each switch pair to update their routing tables correctly with network information from the remote networks and made sure that pairs of TCP/IP end stations running Ganyমে Software's Chariot could communicate across the network.

Test 5: IPX routing (optional)

Description: Each switch pair must properly route IPX traffic.

Degree of difficulty: Low

Continued on page 84

FLOW CONTROL FEEDBACK

BY GREG KILMARTIN AND SCOTT HAMILTON

Flow control is a mechanism created to manage the flow of data between two full-duplex Ethernet devices. Through flow control, a device that is oversubscribed — either macroscopically from a system resource perspective or microscopically on a port-by-port basis — sends a pause message to its link partner to temporarily reduce the amount of data it's transmitting. Otherwise, buffer overflow occurs, data is lost and retransmission is required.

When we conceived these interoperability tests, we thought flow control would be a pretty straightforward test. After all, there's a standard for how a switch should act: IEEE's 802.3x standard for flow control over Fast Ethernet and Gigabit Ethernet. But the IEEE standard only requires a device to respond to pause frames and doesn't require it to initiate pause frames. We set out to determine which devices send, receive and respond to pause messages after we deliberately oversubscribed a single port.

Well, vendors had a lot to say about that, particularly since not all their devices are capable of receiving, sending and/or responding to pause messages. Devices that support Symmetric Flow Control can transmit and receive pause frames. Devices that support Asymmetric Flow Control can only transmit or receive pause frames.

Nonetheless, we continued as planned, but promised vendors the opportunity to air their views on flow control. Most were quick to point out that they adhere to the specification because they respond to the pause frames. True, though in our tests we found those responses varied.

To begin with, most vendors have different thresholds for initiating such messages. Cabletron and Foundry Networks initiate pause messages when their boxes are under heavy utilization and system resources become scant because we oversubscribed only one port and didn't attempt to saturate the entire switch, Cabletron and Foundry never initiated pause messages in our tests. Both say their boxes would initiate pause frames under greater load.

Hewlett-Packard points out that quality of service is a better way to handle potential congestion, and Cabletron and Nortel note that QoS features can't operate properly if a switch sends pause frames.

Cisco's edge devices don't initiate flow control messages to remove the possibility of an edge switch slowing the core network. Cisco and Nortel also point out that pause messages could potentially cause head-of-line blocking.

The pros and cons of flow control implementations depend on how a device is deployed in an enterprise and the type of network traffic (data, voice or video) being carried among its link partners. For more detailed information about how Cabletron, Cisco, Foundry, Hewlett-Packard and Nortel approach flow control, see www.nwfusion.com, DocFinder: 4626.

Kilmartin and Hamilton are engineer/analysts at The Tolly Group. They oversaw the Ethernet switch interoperability testing in New Jersey and, with Tolly Director of Engineering John Curtis, developed the interoperability testing methodology. Kilmartin and Hamilton can be reached at gkilmartin@tolly.com and shamilton@tolly.com.

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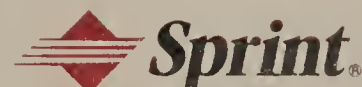
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The point of contactSM

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Participants: Layer 3 switches except Foundry's BigIron 4000 and HP's ProCurve Routing Switch 9304M
Results: All participants passed.

As in our IP routing tests, we required each pair of Layer 3 switches,

configured with static routes or a default gateway, to communicate over two different networks. This time we set up one backbone IPX network and one private IPX network.

Participation wasn't 100%. Of the seven Layer 3 switches, Foundry's BigIron 4000 and HP's ProCurve

Routing Switch 9304M don't support static IPX routing.

Test 6: IPX RIP (optional)

Description: Each switch pair must exchange routing table information in compliance with IPX RIP.

Degree of difficulty: Low

Participants: Layer 3 switches

Results: All participants passed.

To verify IPX RIP interoperability, we required each pair of Layer 3 switches to communicate over a backbone IPX network and a private IPX network. As in our IP RIP tests, the participants did not configure their switches with static route entries but instead let the switches build dynamic routing tables based upon exchanged RIP information. We required each switch pair to update their routing tables correctly with network information from the remote networks and again made sure that pairs of IPX end stations running Ganymede's Chariot could communicate across the network.

Test 7: Link aggregation (optional)

Description: Each switch pair must interoperate over a single aggregated link consisting of two full-duplex, Fast Ethernet links.

Degree of difficulty: Moderate

Participants: All except IBM's 8275-416 Ethernet Switch

Results: All participants passed.

All the vendors tested have developed link aggregation schemes that let you bundle multiple point-to-point links to create a single logical link of greater bandwidth; Cisco's Fast EtherChannel, Lucent's OpenTrunk and Cabletron's SmartTRUNK are a few examples. Because implementations vary, we didn't verify compliance with any particular specification, such as the IEEE's pending 802.3ad Link Aggregation Protocol. Nonetheless, we wanted proof that proprietary trunking solutions can work in a multivendor environment.

To test link aggregation, we set up pairs of switches connected by a single aggregated link consisting of two full-duplex Fast Ethernet links. We generated 1,518-byte packets from a pair of SmartBits ports to two nonaggregated "feeder" ports on each switch and checked to see that each switch then forwarded traffic to its mate across an aggregated "trunk" link at a rate that exceeded the bandwidth of a single link. That is, we ensured the system forwarded more than 100M bit/sec in each direction across the trunk.

Only IBM's 8275-416 Ethernet Switch doesn't support link aggregation. The other 11 switches participated, and all passed.

Test 8: Accelerated convergence (optional)

Description: Each switch pair must demonstrate that proprietary reconvergence schemes can interoperate and yield faster recovery times than Spanning Tree Protocol.

Degree of difficulty: High

Participants: Cisco's Catalyst 2948G and Nortel's Accelar 1200

Continued on page 86

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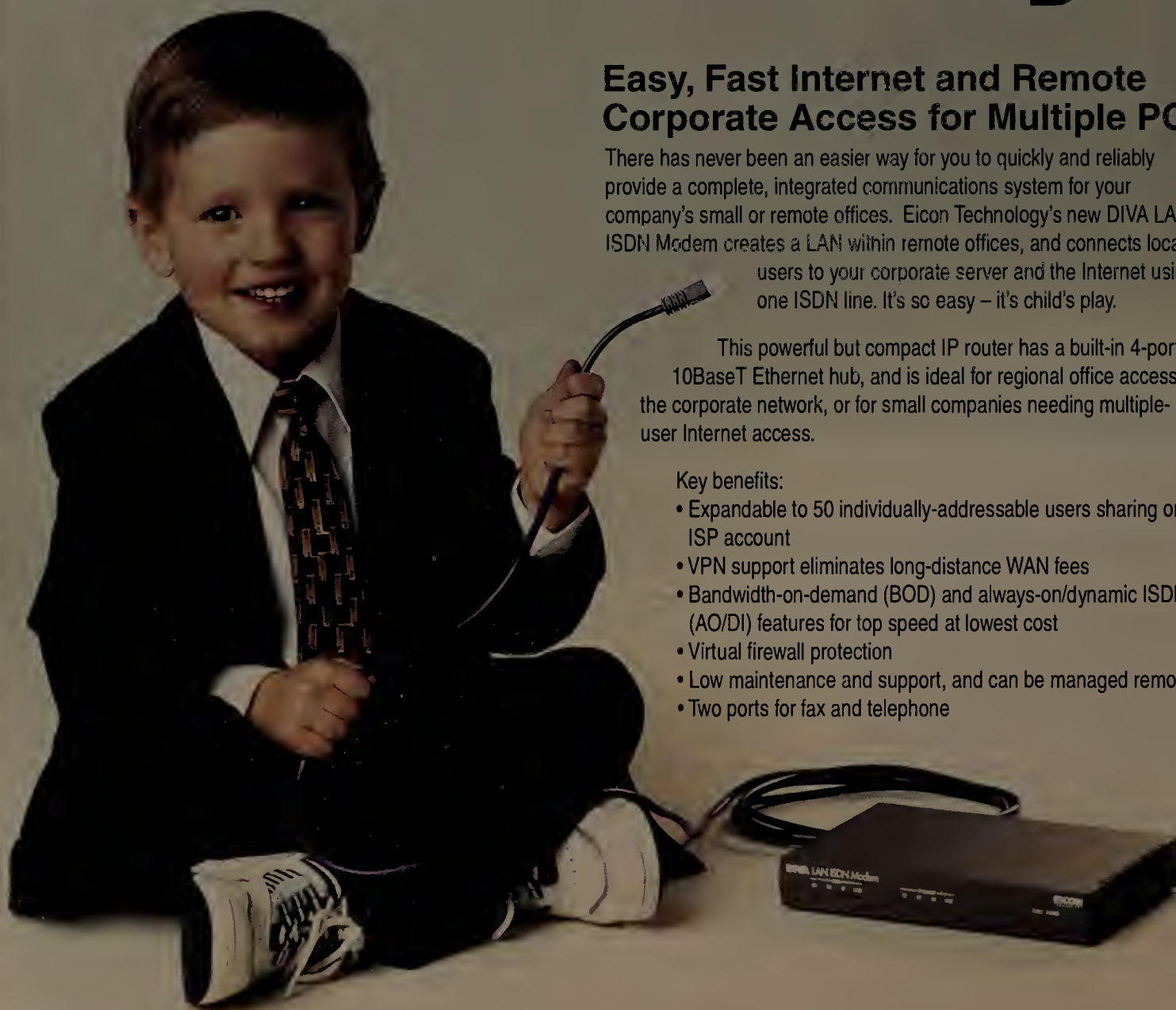
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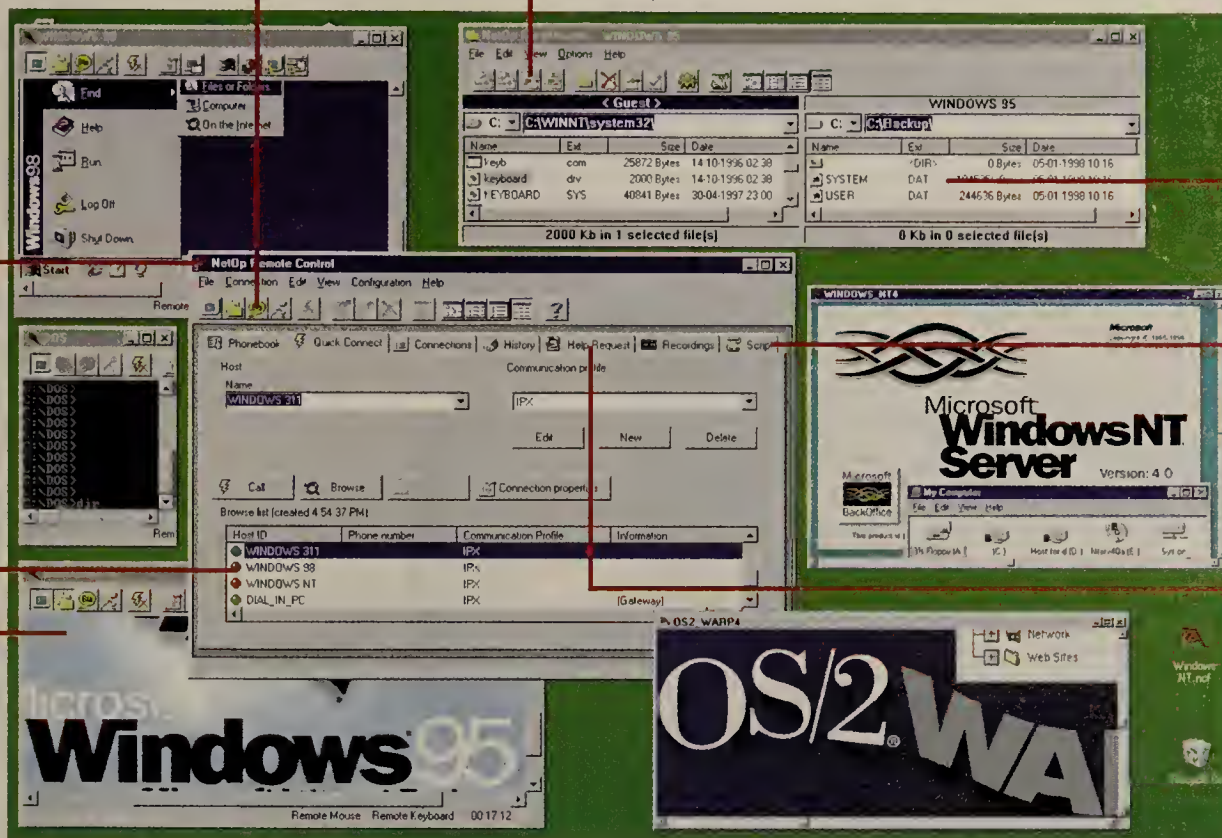
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Continued from page 84

Results: The two participants are interoperable.

Continued interoperability in the event of a hardware or software failure is critical. In the same way vendors have customized trunking procedures,

they have also developed proprietary accelerated convergence systems. These systems purport to speed the recovery process in the event a link fails. The systems are typically a replacement for the 802.1d Spanning Tree Protocol in Layer 2 switch environments.

So we challenged vendors to prove

that their independently developed reconvergence schemes can interoperate — and actually realize a speed gain. Because typical spanning tree converges in as little as 30 seconds, we were looking for quicker redirection and much faster recovery times — within three seconds.

But it seems vendors aren't as confident in this arena as they are with link aggregation. Only two vendors accepted the challenge. We connected two of Cisco's Catalyst 2948G switches and two of Nortel's Accelar 1200 switches and configured them in a partial mesh so each switch from Cisco connected to both switches from Nortel and vice versa, yielding four links. We then disconnected the active link for each vendor and verified, using ping, the reconvergence time was less than three seconds.

Test 9: Standby routing protocol (optional)

Description: Each router pair must demonstrate that a backup router will take over if a primary device fails, in accordance with Virtual Router Redundancy Protocol (VRRP).

Degree of Difficulty: Moderate

Participants: All Layer 3 devices except Cisco's Catalyst 8510

Results: All participants passed.

Along the same idea as the reconvergence test is our standby routing protocol test. The VRRP designates a backup router that automatically takes over if the primary router fails. The backup router must assume all responsibilities and identities of the failed device and intercept IP traffic sent from clients to the failed router. This process saves the manual step of reconfiguring all clients to a replacement router.

As in the reconvergence tests, we connected two routers from each vendor and deliberately disconnected one router. A passing grade required that the remaining routers recovered and took over communications with the failed device's clients. All six participants passed. Cisco didn't participate because its units support the company's proprietary Hot Standby Routing Protocol rather than VRRP.

Test 10: Gigabit Ethernet uplink (optional)

Description: Each pair of switches must interoperate across a single, full-duplex Gigabit Ethernet (1000Base-SX) uplink.

Degree of difficulty: Low

Participants: All except IBM's 8275-416 Ethernet Switch and 8371 Multilayer Ethernet Switch

Results: All 10 participants passed.

Our last optional test was the Gigabit Ethernet uplink test — another gimme in our book and the one area vendors didn't shy away from. This test was optional only because not all products have gigabit ports: IBM's 8275-416 Ethernet Switch and 8371 Multilayer Ethernet Switch don't. The other 10 switches have gigabit ports, and all successfully interoperated with one another across single, full-duplex Gigabit Ethernet (1000Base-SX) uplinks.

Sullivan is Network World's former Reviews editor.

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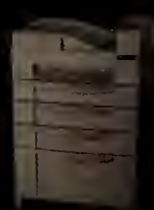
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Feature

FOUNDRY SETS BAR FOR SWITCHMETRIC

BY CHARLIE BRUNO



Foundry Networks is king of the price/performance hill among Gigabit Ethernet switch makers.

Foundry's TurboIron/8 switch swept all three Gigabit Ethernet price/performance testing categories — Layer 2, Layer 3 IP and Layer 3 IPX — in Round Two of the ongoing series of SwitchMetric tests co-sponsored by *Network World* and The Tolly Group.

In sweeping all three Gigabit Ethernet categories, Foundry's TurboIron/8 edged out 3Com's SuperStack II Switch 9300, which last April emerged as the lowest cost-per-gigabit-of-throughput leader in Layer 2 testing. The TurboIron/8 lowered the Layer 2 cost per gigabit of throughput bar, coming in at \$1,249, compared to the standing measurement of \$1,325 for 3Com's SuperStack II Switch 9300.

But while Foundry managed to pull away from 3Com in the Gigabit Ethernet realm, Hewlett-Packard held on to its significant lead in the Fast Ethernet Layer 2 contest. No switch tested in either round of the SwitchMetric has come close to the \$956-per-gigabit-of-throughput ranking of HP's ProCurve Switch 4000M.

The Network World/Tolly Group SwitchMetric is a new benchmark intended to help you determine the price you pay for each gigabit per second of through-

Foundry brings home all Gigabit Ethernet honors; HP holds Fast Ethernet edge.

put a switch provides.

For each type of switch, we gave vendors the option of participating in any or all of three basic tests — Layer 2, Layer 3 IP and Layer 3 IPX — depending on which markets they believe their products are best-suited to serve.

For each protocol, we conducted separate tests with frame sizes of 64 bytes, 512 bytes and 1,518 bytes. The cost-per-gigabit-of-throughput results offered are derived from tests with 1,518-byte frames, which offer the least processing overhead of all frame sizes tested and thus should result in the highest throughput.

All tests were conducted in a state-of-the-art test bed featuring Netcom Systems' SmartBits Advanced Multiport Performance Tester/Analyzer/Simulators.

In this second round of testing, we put five switches from four vendors through the price/performance paces throughout July and August. The switches tested in Round Two included: Foundry's TurboIron/8 and FastIron 2; Performance Technologies' Nebula 4000; Cabletron's SmartSwitch 2200; and 3Com's CoreBuilder 3500.

All told, the complete SwitchMetric price/performance database includes information about eight Gigabit Ethernet switches, 10 Fast Ethernet switches and a smattering of FDDI, token-ring and hybrid switch offerings.

The results: Gigabit switches

On the Gigabit Ethernet switch side, since the start of the SwitchMetric program all switches tested offered between eight and 64 ports and were configured in a fully meshed network design. Nearly all of the switches tested in both rounds achieved wire-speed throughput at each frame size, although there were a few exceptions, such as some 3Com and HP switches.

Foundry's TurboIron/8 proved to be the best value across all three Gigabit Ethernet switch sectors tested. In the Layer 2 tests, the TurboIron/8

offered a cost per gigabit of throughput of \$1,249, or about 6% less than 3Com's SuperStack II Switch 9300. On top of the cost-per-gigabit-of-throughput advantage, the TurboIron/8 achieved wire-speed throughput in recent testing. 3Com's SuperStack II Switch 9300 achieved 94% of the maximum throughput in testing 1,518-byte packets when the product was tested last April. 3Com's SuperStack II 9300, as well as the company's CoreBuilder 9400, achieved wire-speed performance in the April tests using 64- and 512-byte frames.

In the Layer 3 tests, Foundry widened the cost-per-gigabit lead it enjoys over the competition with its

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latest SwitchMetric entry. Test results show that the TurboIron/8 offers a cost per gigabit of \$1,874 for Layer 3 IP throughput. That's 53% less than the cost-per-gigabit figure of HP's ProCurve Routing Switch 9308M, which offers a cost per gigabit of \$3,515. Foundry offers two other switches — the BigIron 4000 and BigIron 8000 — which rate above the HP ProCurve 9308M, but below the TurboIron/8.

In the Layer 3 IPX tests, the TurboIron/8's cost-per-gigabit figure of \$1,874 replaced the vendor's own BigIron 4000 as the top-ranked switch in that category. The BigIron 4000 Layer 3 IPX rating stands at \$2,280 per gigabit of throughput.

Foundry's TurboIron/8 switch draws its processing power from a design that relies heavily on multiple onboard Application Specific Integrated Circuits, each of which is designed to handle per-port wire-speed processing. The TurboIron/8 also supports Foundry's multilayer switching feature, which enables the company's backbone switches to transparently perform processing-intensive IP and IPX traffic forwarding, freeing existing routers to handle topology management and non-IP and IPX traffic.

Fast Ethernet findings

On the Fast Ethernet side, The Tolly Group tested two new switches, neither of which were able to dethrone HP's ProCurve Switch 4000M as the cost-per-gigabit-of-throughput leader among switches in that category.

Performance Technologies' Nebula 4000 offered a Layer 2 cost-per-gigabit ranking of \$2,782, which is

Continued on page 92

SwitchMetric Leaderboard

Switch type/test	Vendor/product	Cost per gigabit of throughput
Gigabit Ethernet — Layer 2	Foundry TurboIron/8	\$1,249
	3Com SuperStack II 9300	\$1,325
	3Com CoreBuilder 9400	\$1,764
	Foundry BigIron 4000	\$2,280
	Foundry BigIron 8000	\$2,413
	HP ProCurve Routing Switch 9308M	\$3,515
Gigabit Ethernet — Layer 3 IP	Foundry TurboIron/8	\$1,874
	Foundry BigIron 4000	\$2,280
	Foundry BigIron 8000	\$2,413
	HP ProCurve Routing Switch 9308M	\$3,515
	HP ProCurve Routing Switch 9304M	\$3,531
Gigabit Ethernet — Layer 3 IPX	Foundry TurboIron/8	\$1,874
	Foundry BigIron 4000	\$2,280
	Foundry BigIron 8000	\$2,413
	HP ProCurve Routing Switch 9308M	\$3,515
	HP ProCurve Routing Switch 9304M	\$3,531
Fast Ethernet — Layer 2 (no 10M or Gigabit links)	HP ProCurve Switch 4000M	\$956
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	Performance Nebula 4000	\$2,782
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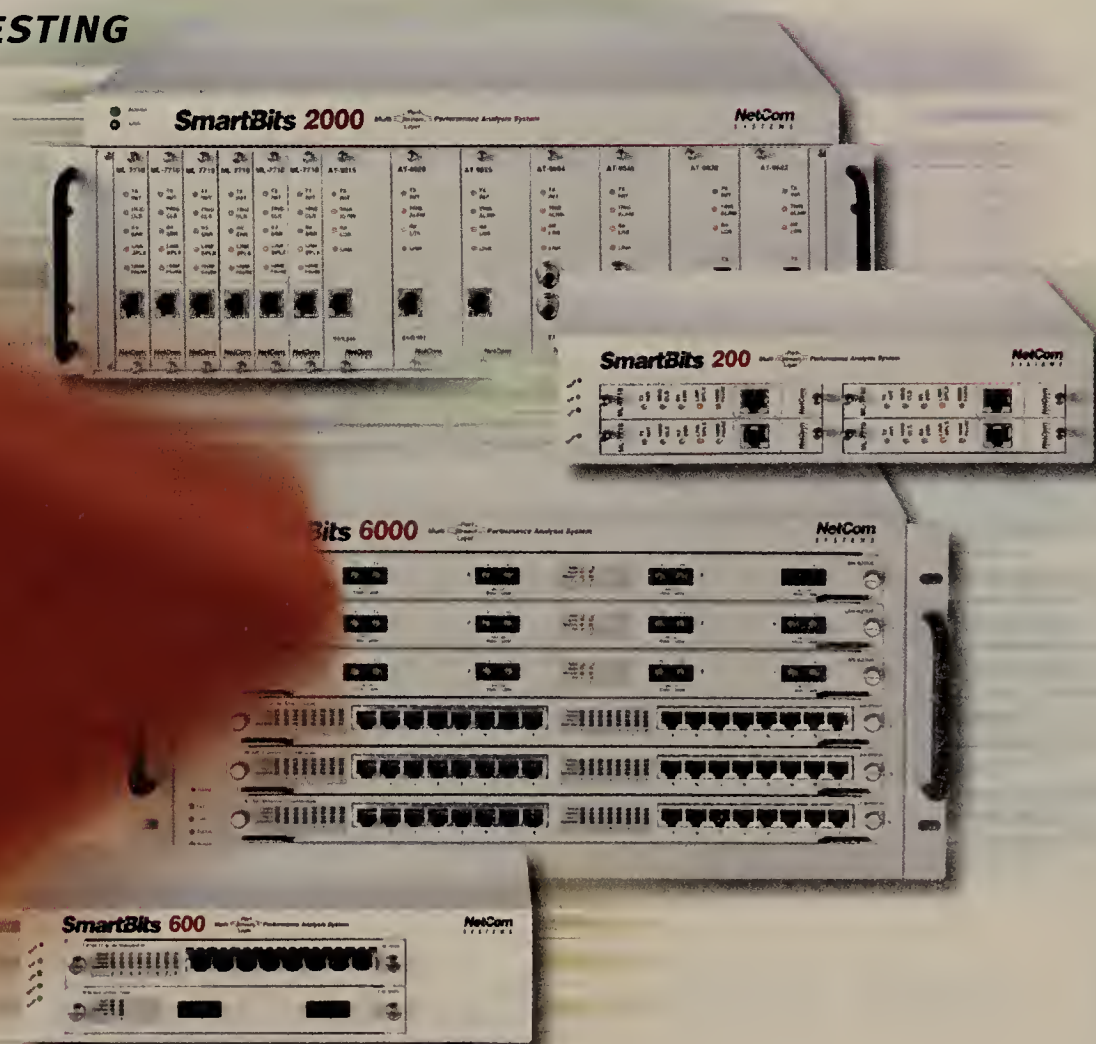
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THE KEY TO QoS TESTING



Continued from page 89

considerably higher than the ProCurve Switch 4000M.

The disparity is due to the fact that the Nebula 4000 is a multimedia switch that also offers fault tolerance, unlike basic Fast Ethernet switches that are

designed simply as packet pushers, says Alan Brind, vice president of marketing and business planning at Performance.

Certainly any switch that offers fault tolerance, such as Performance's Nebula 4000M, is likely to include a larger footprint, bigger power supplies, extra cooling fans, extra hardware and

added resiliency, which will drive up the cost-per-gigabit figure.

The Tolly Group also tested Cabletron's SmartSwitch 2200, a 13-port edge switch that includes 12 local Fast Ethernet ports and a single ATM OC-3 uplink port. To date, the SmartSwitch 2200 is the only Fast Ethernet-to-ATM

switch tested in the SwitchMetric. The device was configured to test 12 Fast Ethernet ports operating locally, with one Fast Ethernet port feeding data upstream to the ATM OC-3 port. As configured, the device offers a cost per gigabit of throughput of \$6,915. Company officials attribute the high price/performance cost to the single OC-3 port.

"The SmartSwitch 2200 is more than just a fast frame pumper," says John Pappas, senior program manager in Cabletron's Strategic Testing Group. "Sure, it can offer 100% wire-speed throughput, but it also offers Layer 4 quality of service [QoS] so you can configure prioritization over application-specific datastreams. That's something that cost per gigabit doesn't take into account."

The Network World/Tolly Group SwitchMetric evaluates switches on a least-common-denominator basis, meaning switch throughput and cost variables are the key comparative criteria. Higher level functionality, such as Layer 4 switching, QoS functionality and advanced filtering techniques, are not factored into the cost-per-gigabit metric.

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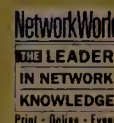
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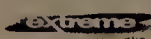
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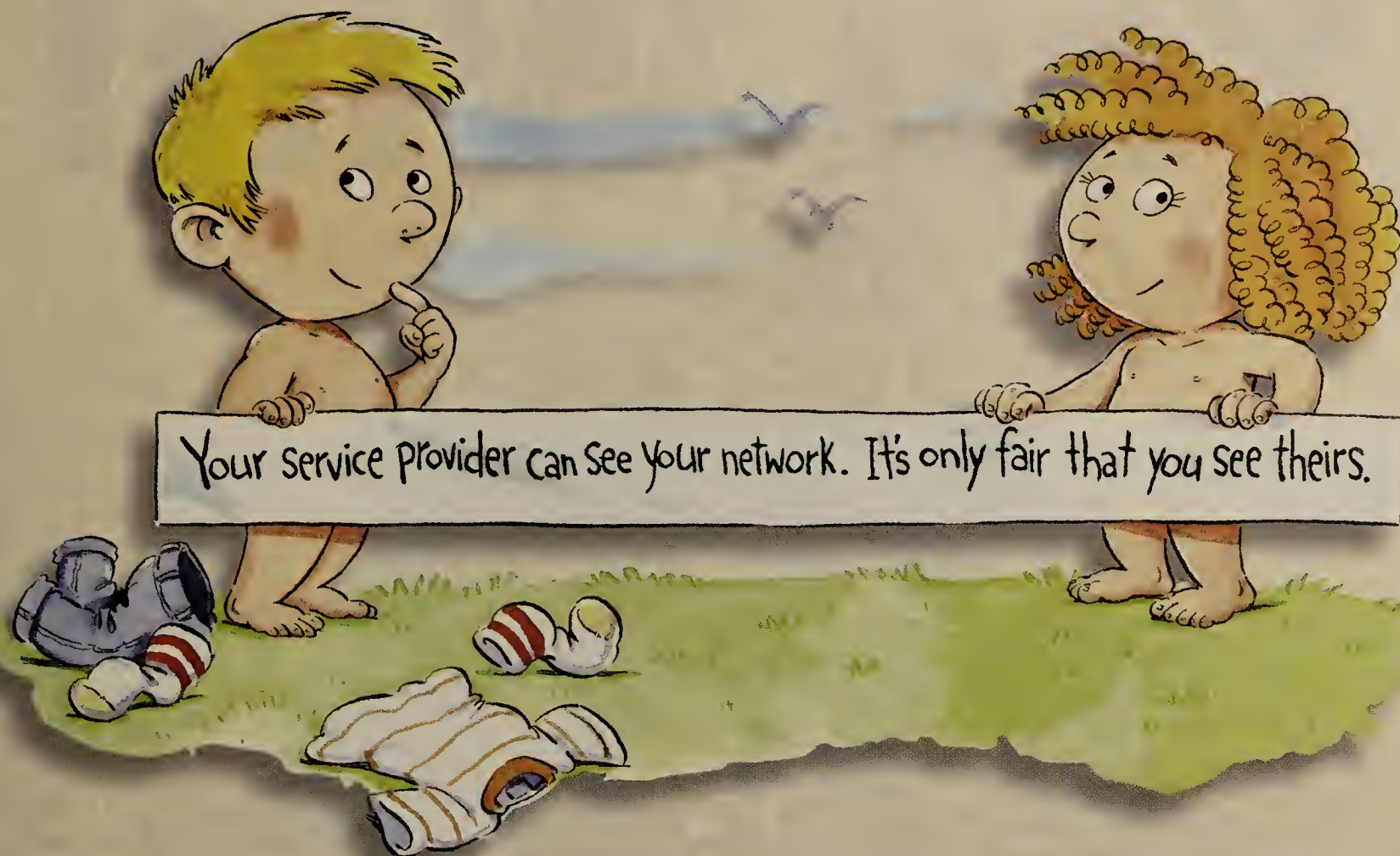
The next step

Clearly, Foundry has emerged as the cost-per-gigabit-of-throughput leader among the vendors that have stepped up to the SwitchMetric challenge. With an average cost-per-gigabit-of-throughput ranking of \$2,644 among all switches included in this study, the competition has got some serious catching up to do to reach the TurboIron/8's \$1,249 watermark.

Is any vendor up to the challenge of knocking Foundry from its perch? We invite any and all to come into the lab and take their best shot.

Bruno is managing editor of publishing products at The Tolly Group. He may be reached at cbruno@tolly.com.

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Feature

The DAWN of service Management

In the future, you'll be spending less time managing your network and more time managing your service providers. Find out what tools you'll need.

BY JOHN MORENCY

The very nature of enterprise network management is about to undergo a fundamental change. In the future, network managers will be focusing less on the traditional tasks of designing, implementing and operating complex LANs and WANs, and more on the selection and management of external service providers.

This shift from network management to service management will require net managers to deal with a whole new set of strategic decisions, such as what parts of the network should be kept private and what parts should go public, and whether voice or data services are to be included. Network managers will also have to negotiate complex service-level agreements (SLA) and monitor them in an environment in which adequate tools to do so don't exist yet.

In the long run, however, network managers will benefit from this shift toward service providers. There will be an unprecedented level of choice in determining support responsibility for the next generation of network and application

services. Some, most or all of the services can continue to be managed by the enterprise support staff or turned over to one or more external providers.

The key factors driving shops in the direction of service providers are the explosion in e-business and the difficulty in attracting and retaining qualified staff. For example, Forrester Research predicts that Internet services revenue from business-to-business communications will grow from nearly \$4 billion in 1998 to nearly \$60 billion by 2003.

And service providers are responding to this anticipated surge in demand. Forrester Research indicates that while worldwide equipment spending for enterprise networks exceeded that for service providers by a substantial 68% to 29% margin, this gap is expected to be narrowed by a factor of three over the next two to three years.

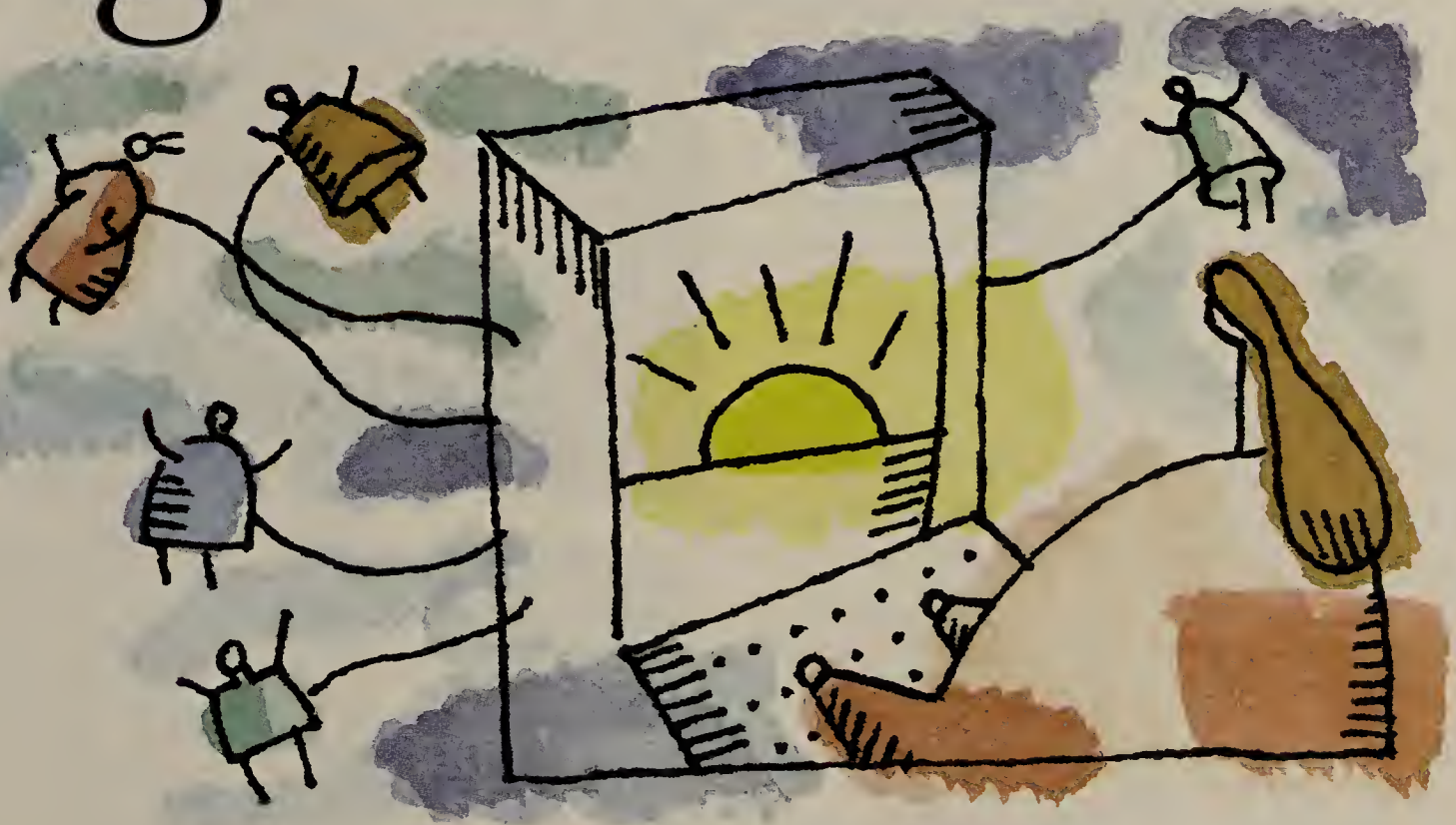
But simply building the infrastructure and offering the services will not suffice. As recent incidents at Amazon.com, eBay and ESPN's Fantasy Baseball site have demonstrated, network outages

— once accepted as a fact of life — can cost companies millions of dollars and are no longer acceptable.

In addition, network managers are becoming increasingly sensitive to the lost revenue opportunities that occur when poor Web site performance directly results in substantially reduced access traffic. The increasing sophistication of Web management tools is enabling many of these managers to more reliably correlate the occurrence of increased site response time with substantial drops in the number of concurrent online users.

The result is that the once intracompany enterprise network is rapidly becoming the multicompany interenterprise network when e-business becomes the game. And this change not only affects data, but also increasingly voice and video, as well. Consequently, high-quality service tethering of each to the other will become fundamental to the growth of the "E-economy."

As this happens, traditional monitoring tools that only work in enterprise networks or service



provider networks, but not both, will become increasingly inadequate. New tools that support both arenas will become a mandatory requirement, given the rapidly blurring boundary between public and private networks.

These products are not available yet. But network managers should expect to see product advances beginning in a few key areas over the coming year, most notably for basic Internet access, virtual private networks, digital subscriber line access and managed application services.

The advances will support much more of a shared service management model between the service provider and the enterprise manager than has traditionally been the case. The enterprise manager will benefit as more service providers open their management reporting systems to customer Web browser access.

Public service-level management

A key part of service management is the SLA, a formal contract between service providers and users on the quality of service (QoS), availability and performance that will be delivered by the provider.

Without question, the service provider community is beginning to understand and embrace this shift toward guaranteed levels of service. Today, AT&T, MCI WorldCom and Sprint all offer a minimum of 99.9% (and in a number of service instances 100%) availability for public frame relay, ATM and IP access services. In addition, ISP Concentric Network now offers a 100% availability guarantee, which includes the network backbone and local loop, as well as an average round-trip latency guarantee of 80 msec and a guarantee that packet loss will not exceed an average of 1% per month.

UUNET offers 100% availability guarantees for its dedicated-line and frame relay Internet access services, which cover UUNET's backbone as well as the customer access circuit. A somewhat lower, but still substantial, service guarantee is offered by PSINet, which claims a 99.5% availability level for its basic Internet access services, including Inter-Frame and IntraNet.

Even with the increase in service provider SLA guarantees, however, few if any corporate customers have had any means of measuring or validating monthly service quality claims. The obvious major exception is frame relay, for which industry players such as DeskTalk Systems, Concord Communications, Visual Networks, NextPoint Software and Paradyne today offer some form of hardware and/or software product support for more rigorous service-level tracking of carrier-based frame relay services.

These tools address a major loophole in SLAs — the fact that the service provider measures the level of service, rather than the customer or an independent third party. Traditionally, the frame relay user has been dependent on manual reports produced monthly by the provider. This approach suffers from two drawbacks: The first is lack of reporting timeliness, and the second is the lack of perceived reporting objectivity.

Collectively, the drawbacks have limited the perceived value of provider-defined SLAs, particularly with respect to real-time e-business services.

Enterprise service-level management

The effectiveness of SLAs within the enterprise has also been mixed. Despite the fact that service-level management has been a frequent topic of discussion for the press and

industry pundits, business justification for the implementation of service-level management and supporting products has been anything but a straightforward exercise for many users.

Research jointly conducted last year by Renaissance Worldwide and McConnell Consulting showed that the business case for implementing in-house service-level management was weak. Implementation often resulted in increased costs without clearly defined benefits. And the setting of unreasonably high expectations was quickly followed by end-user dissatisfaction with the QoS delivered by IT.

An additional finding was the common realization among many of the users that current product offerings were only focused at lower-level network transport services or higher-level network application services, but not at supporting both sets of services within the same product. Therefore, product



Key features of next-generation service management products:

- 1 An end-user accessible view of the delivery quality of network and application services.
- 2 Views of the enterprise and provider networks that are available to both the service provider and the enterprise network manager.
- 3 Nondisruptive service quality testing that can be initiated by either the provider or the enterprise network manager.
- 4 Dynamic service quality thresholds that result in timely alert generation leading to prompt problem resolution.
- 5 A standards-compliant database that serves as a reliable repository for all services-related data.

offerings did not often align well with internal service delivery expectations.

In this context, respondents said they needed service management products that would provide a level of availability and performance support for corporate e-mail systems and Lotus Notes networks comparable to that provided for Fast Ethernet, frame relay or ATM. The benefit, they said, would be a more comprehensive and effective approach to meeting the needs of internal stakeholders without the drawback of excessive product implementation complexity.

Looking at the collective state of existing service provider and enterprise staff-supported SLAs, one finds a complementary set of strengths and weaknesses. In general, service providers have significant technical and staff advantages in service delivery, but oftentimes they have few tools for objective and timely reporting. Numerous product options exist for service-level management within the enterprise, but enterprise support organizations do not often have the technical or support staff to match the level of service delivery offered by an external provider, particularly when Internet and Internet-based applications services are considered.

Come together

What is required, therefore, is a new generation of products that will offer enterprise managers three key features:

- A more integrated means of managing the inevitable set of public IP services that will be

required to support end-to-end e-business.

- The ability to effectively mine enterprise network and provider network-based management data in order to deliver a complete, accurate and timely picture of network performance, delay and availability.

- The ability to implement service management from the application to the plumbing layer irrespective of whether application services are being supported in-house or by an external provider.

The good news is that early products sporting some of these features are starting to appear. Leading-edge vendors such as Inverse Network Technologies and Keynote Systems offer network managers the opportunity to benchmark ISP availability and response time for the user's own site, as well as additional sites of the user's choice. In addition, Quallaby Corp. has extended its Proviso product line to enable service providers to deliver Web-based SLA reports to customers.

The products, while certainly breaking some significant new ground, are only the beginning. Over time, users will require increasingly sophisticated service-level management software that supports all network elements involved in the delivery of one or more crucial e-business applications and so blurs the traditional distinction between private and public networks.

In addition, the ability to initiate proactive testing and monitoring of any network component from the enterprise or service provider side will also be important in order to rapidly isolate problems that occur. These are particularly crucial factors for the successful growth of current and future applications service providers.

The stakes are high

The combination of the rapid and profound changes occurring in enterprise network management combined with the mixed success SLAs have had with enterprise and service provider network managers is contributing to the evolution of a new management model — service management.

Service management refers to the changing role of traditional network managers, who are becoming more like public service portfolio managers, as well as the approach enterprise managers need to take in assembling the components of their next-generation management tool kits.

Increasingly, the tools will need to concurrently support the management of the in-house network, as well service provider offerings (particularly those of ISPs) that collectively deliver the set of services for which the enterprise manager is being held accountable. The tools of greatest use will be those that support a shared partnership management model between the service subscriber and the provider in the service-level delivery of one or more e-business applications.

The extent to which this functionality can be accommodated as logical extensions of existing service-level management tools from vendors, such as Concord, DeskTalk, Visual, NextPoint, InfoVista and Micromuse, will enable better progress by more effectively using products that users already have installed.

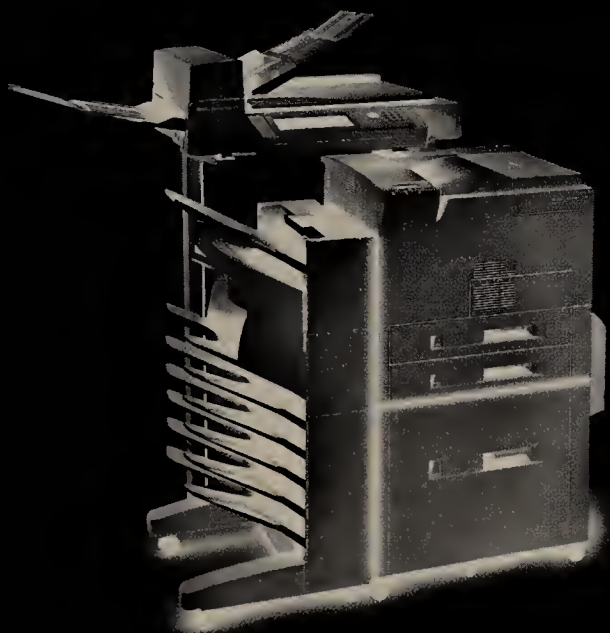
The difference between this service-level management model and previous ones is the fact that real business is now at stake for both partners. And this alone is incentive enough to ensure that ultimately all the pieces fit together.

Morency is executive vice president of consulting at Sage Research in Natick, Mass. He can be reached at jmorency@sageresearch.com.



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ARE YOU READY FOR CONVERGENCE?

How to tell if you should become an early adopter.

BY KEN FIGUERO
AND BRIAN TOLL

With all the hype surrounding convergence, network executives are left wondering, "Is this for me?" While vendors are pushing their customers to quickly adopt new technologies, it is important to understand that not every company will benefit from early adoption.

Here are some guidelines to help you decide whether you should jump in right away or take a more cautious approach to merging your voice and data networks.

One thing is clear: Convergence, or integrated communications services (ICS), is inevitable. In this new world, distinctions between voice and data will no longer exist. Services will be provided on a single network where streams of data are differentiated for delivery within specified time requirements.

Barriers to adoption

For managers attempting to plan for convergence, coordination between IT and the telecommunications group is key. In most companies, the IT and telecom departments are separate, and that creates organizational challenges that act as a barrier to the adoption of integrated services.

Existing service contracts are also a barrier. Firms looking toward convergence in the next two to five years should revisit their negotiations with carriers. Companies with flexible contracts are in a better position to experiment with and adopt ICS.

Three phases of adoption

The question that should concern executives is not whether to invest, but when. The answer depends on several factors including a firm's physical characteristics (size, geographic dispersion); its relationship management requirements (call centers and extranets as they relate to supporting a large quantity of customers); its usage patterns; the condition of its current telecom infrastructure; existing voice/data contractual commitments; and its attitude toward technology. Take the test (right) to determine which adoption strategy is most appropriate for you.

Phase 1 — Development and exploration

In the development and exploration phase, vendors and service providers are still experimenting

with technology and applications. Many competing visions exist for implementing quality-of-service (QoS) standards that will allow time-sensitive transport technologies to function successfully.

During this phase, aggressive cost cutters are taking the greatest risks. Most firms will benefit from a limited voice on the 'Net rollout to bypass international call settlements and save on phone bills.

Another reason to invest during this phase is the potential of gaining technology-based, first-mover competitive advantages. Converged services offer potential cost savings and improved customer service, and experimentation during this phase provides firms with valuable knowledge for future projects. Additionally, some firms are at the point in their infrastructure cycles in which older equipment is best replaced with new equipment that is ready for packet-based communications.

Phase 2 — Application

This phase will begin when a group of core technologies that resolve QoS issues while providing interoperability has been identified. Software vendors will focus on developing user-friendly applications with mass-market appeal. We expect political issues surrounding international settlements, universal service and Internet security to be addressed during this phase. As a result of mass-market advertising, managers, employees and consumers will be accustomed to convergence, and this will advance the pace of infrastructure improvements and adoption.

Companies that did not invest during the earlier phase will adopt best-in-class solutions. Improved marketing, service delivery and customer care will erode technological advantages gained by early adopters. Much of the equipment designed for circuit-switched networks becomes obsolete as dual-function equipment emerges. This phase marks the beginning of full-scale investment and adoption of integrated communications services.

Phase 3 — Solution implementation

In this phase, the integrated voice/data network represents a standard plan for enterprises and service providers. Cost cutting and competitive advantage are no longer factors in the decision to adopt because almost all commercial offerings are based on converged technologies. All enterprise investments in hardware replacement will be channeled into convergence-ready, compatible devices.

Figueredo is a senior manager in KPMG's Communications practice. Toll, formerly with KPMG, is a graduate student at MIT's Sloan School of Management. Figueredo and Toll can be reached at kfigueredo@kpmg.com and btoll@mit.edu.

The views and opinions are those of the author and do not necessarily represent the views and opinions of KPMG LLP. The information provided here is of general nature and is not intended to address the specific circumstances of any individual or entity.

Take the convergence test

On a scale of 1 (unfavorable, very unlikely, not a correct statement) to 5 (very favorable, very likely, very true statement), where 3 is neutral, answer the following questions:

Adoption readiness framework	Score
1 The company is large and geographically dispersed.	
2 The company builds and maintains its network strategy in a centralized fashion.	
3 The company uses call centers to support customer care and sales efforts.	
4 The company has a significant amount of international long-distance calls or a significant amount of interoffice calls.	
5 The company makes heavy use of long-distance faxes.	
6 The company's telecom infrastructure (telephones, PBXs, etc.) will be replaced over the next three years.	
7 The company has planned and set aside resources to allow for expanding data requirements over the next three years.	
8 The company's current long-distance contract will expire in the next three years, and the company would switch long-distance carriers if a competitor could offer a 10% reduction in long-distance costs with comparable quality and customer service.	
9 The company is actively pursuing ways to improve communications using emerging technologies such as extranets, unified messaging and videoconferencing.	
10 The company is aggressive in pursuing and implementing new technologies.	

TOTAL SCORE

Total the score, and use the chart below to correlate it to a phase.

Score range	Phase
35 – 50	Development and exploration
21 – 34	Application
10 – 20	Solution implementation



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IBM has positioned the Netfinity 5500 M20 as an "entry enterprise" server to fill the space between the workgroup and enterprise server markets. This server has a lot of availability and serviceability features and a well-thought-out, easy-to-service chassis that can accommodate as many as four processors.

The Netfinity 5500 M20 scored a respectable 8.7 overall in our review. The server scored a perfect 10 for management and serviceability with the best offerings we have seen in these categories. It scored a 7 for features and flexibility, mainly due to the limited number of PCI, hard drive and RAM slots on board.

In the important category of performance, the 5500 M20 earned an 8.8 — near the top, but not the best we've seen. The server scored a 10 in the network test, almost as high in the database test, and a 7 in the file server test.

This server comes in a big box, but don't judge it by its cover. The real beauty of the 5500 M20 is the

IBM Netfinity 5500 M20



Quad Xeon server offers great serviceability and availability for the buck.

BY JOHN BASS,
NETWORK WORLD TEST ALLIANCE

inside, where the internals are laid out superbly. There are plenty of nice touches — all hot-swappable components have terra-cotta-colored

pull tabs. All user-serviceable parts that must be removed while the server is powered down have blue pull tabs.

In addition to the well laid-out internals, the server has a light-path diagnostic system similar to a copying machine. If a component fails, a light comes on the front panel. You can look inside the server for a summary card to find out which subsystem has problems. After noting the faulty system, you can find an LED beside the individual faulty components.

The Netfinity 5500 M20 arrived with four 500-MHz Pentium III Xeon processors with 1M byte of Level 2 cache; 2G bytes of RAM; six 9.1G-byte disk drives; a PCI RAID controller; and four Intel Pro100+ Fast Ethernet net interface cards (NIC).

The server has five 32-bit, 33-MHz PCI slots and one ISA slot — fewer than most enterprise servers we've reviewed, but in line with the server's target buyer, the price-conscious enterprise. Four of the PCI slots let you swap, upgrade or add a PCI card to an empty PCI slot while the server is running — a feature we have only seen from IBM. It worked flawlessly.

The drive cage can hold six 1-inch drives or four 1.6-inch drives. The drive backplane, which allows hot swapping, is connected to a PCI ServerRAID 3H RAID card. Our server was configured with a RAID 0 stripe set across the six drives for

Feature and configuration table

Server	Netfinity 5500 M20
Vendor	IBM (888) 411-1932 commerce.www.ibm.com/cgi-bin/ncommerce/SalesNav?family=Netfinity+5500+M20+(Rack+Mounted)&cntry=840&lang=en_US
Price	\$33,681
Processor type	500-MHz Pentium III Xeon with 1M-byte Layer 2 cache
Number of processors	Four
Number of processors supported	Four
Memory configuration	2G bytes
Number and type of RAM slots	Eight DIMM slots
Expansion slots present	Four hot-swap 32-bit, 33-MHz PCI, one 32-bit, 33-MHz PCI, one ISA
Expansion slots available	One ISA
Disk controller	Two onboard two-channel RAID controllers with two Adaptec 7880 UltraWide SCSI controllers, one for internal use, one for external use (not used in this configuration) One ServeRAID 3H PCI single-channel Ultra2 SCSI hardware RAID card
Hard drive description	Six 1-inch 9.1G-byte IBM 10,000 rpm hard drives
Number and description of hard drive bays	Six 1-inch or four 1.6-inch hot-plug drive cage
Network interface	Four Intel Pro 100+ Fast Ethernet NIC, one onboard
CD-ROM	Max 32X IDE
Availability features	ECC memory hot-swappable fans, power supplies and hard drives; hot-plug PCI capability with hot-swappable drivers for supported PCI cards
Manageability features	Netfinity service manager, onboard remote management hardware
Security features	Lockable bezel and drive cage
Bundled software	Lotus Domino, Netfinity Service Manager, Server Guide installation aid for NT, NetWare, OS/2, SCO Unixware
Warranty	Three years parts and labor, next day onsite, 90 days phone support, prefailure alerts are warrantied

ScoreCard

IBM Netfinity 5500 M20

Performance (40%)	8.8
Features and flexibility (30%)	7
Management (20%)	10
Serviceability (10%)	10
Total score	8.7

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score**.

the data partition. The four Ethernet NICs were configured for 100M bit/sec, full-duplex operation.

The Netfinity 5500 M20 has an onboard remote management card for managing the server over Ethernet or through a modem. The bundled management software, Net-

finity Service Manager, gives local and remote administrators access to a long list of monitored and managed objects, including utilization, temperatures, fan speeds and system voltages.

The cost-effective IBM Netfinity 5500 M20 offers an impressive list of

serviceability and availability features. This server is an easy launch into the world of enterprise computing, in which uptime and minimal fix time are high priorities.

Server testing is performed at North Carolina State University's Centennial

Networking Labs (CNL) in Raleigh. CNL tests network equipment and network-attached devices for interoperability and performance. Bass, a senior technical staff member at CNL, designs and leads the execution of the test suites. He can be reached at john_bass@ncsu.edu.

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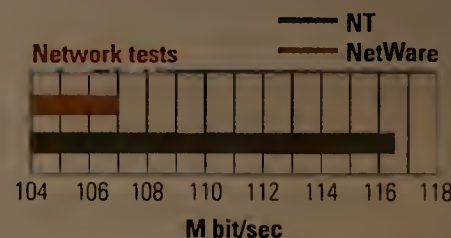
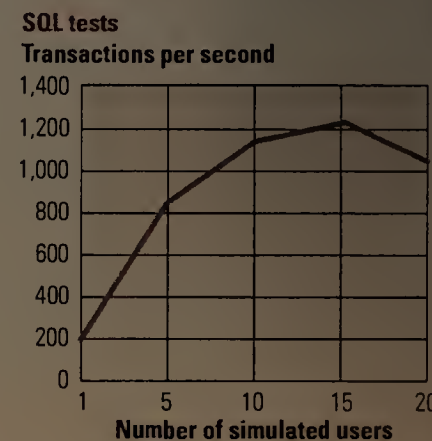
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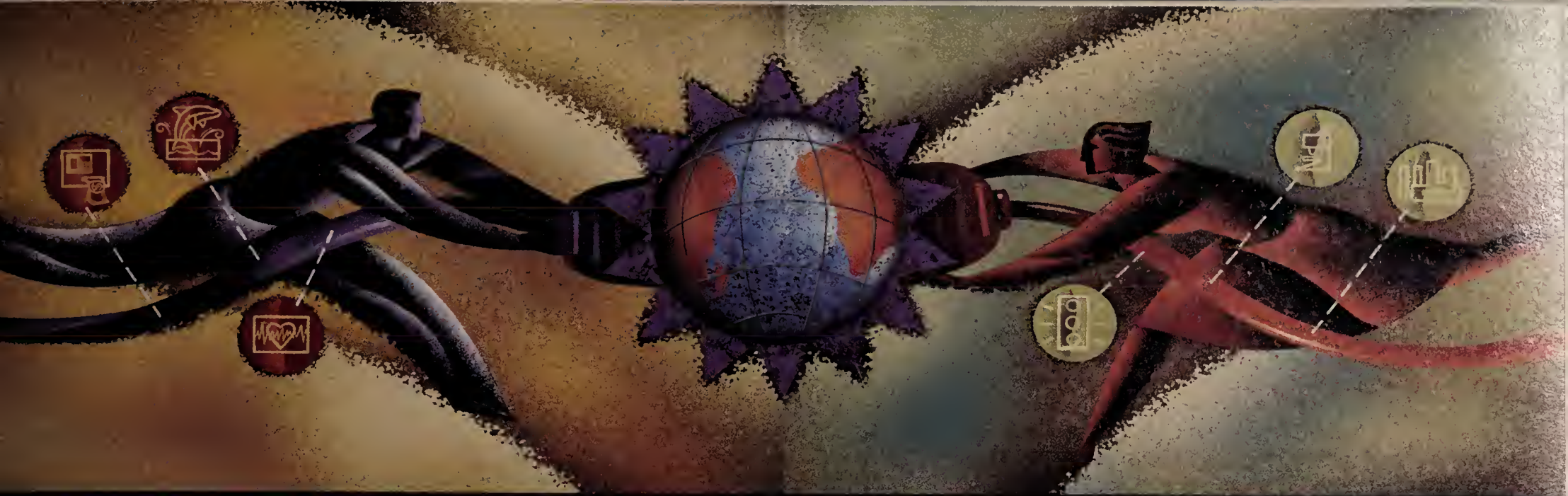
Bass is also a member of the Network World Test Alliance, a cooperative of the premier reviewers in the network industry, each bringing to bear years of practical experience on every review. For more Test Alliance information, including what it takes to become a member, go to www.nwfusion.com/alliance.

Benchmark results

We used Bluecurve's Dymaasure File Professional 2.0 and Dymaasure SQL Professional 2.0 to measure I/O and CPU-intensive operations, and Ganymede Chariot to stress the network interface.



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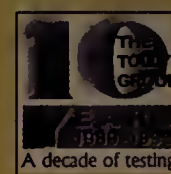


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Executive Interop

Sunday, Sept. 12, through Tuesday, Sept. 14

For senior network executives scrambling to figure out how to adapt their businesses to take advantage of the Internet, this seminar is a must. The seminar starts with a cocktail reception on Sunday, continues with sessions from 9 a.m. until 7:30 p.m. on Monday, Sept. 13, and ends with a morning panel on Tuesday, Sept. 14. Held off the show floor at the Ritz-Carlton Hotel, the Executive Interop program offers tips on how to use electronic commerce in the enterprise and case studies of successful e-businesses. Put together by The Yankee Group, the highlight of the program is a presentation by Charles Feld, chief information officer of Delta Airlines. Executive Interop costs \$1,295.



Network Forensics Day

Monday, Sept. 13, 8 a.m. to 7 p.m.

A new feature at this Interop, Network Forensics Day is designed for network troubleshooters, application developers and network engineers who need tips for diagnosing and solving specific network-related problems. Topics on the agenda include analyzing network performance, determining application response times, detecting intrusions and improving service levels. Sprinkled throughout the day are case studies that offer practical, hands-on feedback to attendees. Free to general conference attendees, Network Forensics Day costs \$595 for all others.

Highlights

Monday, Sept. 13

9 a.m. to 6 p.m.

VPN DAY

Find out about the newest virtual private network (VPN) technologies at this special one-day session, which will discuss secure remote access, secure extranets and quality of service. The program features a combination of technical presentations and product demonstrations, highlighted by the opportunity to try out the latest VPN products in the InteropNet Labs. VPN Day costs \$595.

Tuesday, Sept. 14

10:15 a.m. to 11:45 a.m.

LAYERING YOUR SECURITY STRATEGY FOR MAXIMUM SAFETY

Learn how to keep your corporate data safe from internal and external hackers. Panelists will discuss how to bolster your firewalls with intrusion-detection systems, file integrity assessment and operating system scanning tools. This multi-layered approach to security will be discussed by moderator Steve Schall, a security technology manager at ODS Network, and panelists Paul Ramstedt, senior research engineer at AT&T, and Greg Galford, a senior technologist at Microsoft.

2 p.m. to 3:15 p.m.

THE SUCCESSFUL DEPLOYMENT OF END-TO-END VOICE IN A PACKET NETWORK: IN PERSPECTIVE

Is packetized voice ready for prime time? Find out at this session, led by Brian

MacLeod, vice president of business development for metropolitan-area and regional-area networks at Packet Engines. MacLeod will tell you how to deploy an end-to-end packetized voice service, including hardware options, service limitations and network management features.

3:30 p.m. to 4:45 p.m.

THE STATE OF INTERNET DIRECTORIES

If you want to minimize administrative tasks and maximize efficiencies across your networks, you need a sound directory strategy. Come to this session and learn how to put today's directory and directory-enabled products to work in your corporation. Moderator Daniel Blum, a senior vice president and principal consultant at The Burton Group, will be joined by panelists Russel Weisner, a vice president of engineering at Digital Signature Trust Co., and John Strassner, a chief architect of network services and management at Cisco.

Wednesday, Sept. 15

10:15 a.m. to 11:45 a.m.

A BETTER APPROACH FOR IPSEC

Find out the best way to deploy the IP Security (IPSec) standard. Learn the pros and cons of terminating IPSec at the server, router and firewall. Moderator David Piscitello, president of Core Competence, is joined by Merike Kaeo of Cisco and Peter Ford, senior manager of Internet marketing at MCI WorldCom.

Continued on next page

Highlights cont'd.

11 a.m. to 12:30 p.m.

CRYSTAL BALL PANEL: PEERING INTO YOUR NETWORKED FUTURE

Being a network manager often requires the power to see into the future and predict how technology will change. Knowing what the major shifts will be can save your company a lot of money. To help you, *Network World* has gathered its top columnists to offer up their predictions about the future of your network. Panelists include Mark Gibbs, author of "Gearhead" and "Backspin"; Dave Kearns, author of "Wired Windows"; Daniel Briere and Christine Heckart, authors of "Wan Monitor"; David Rohde, author of "Eye on the Carriers"; Steve Blass, author of "Dr. Intranet" and Joel Snyder, a member of the Network World Test Alliance.

2 p.m. to 3:15 p.m.

SERVICE DIFFERENTIATION TECHNOLOGIES: IMPLEMENTING QOS/COS/TOS

How should you put together an enterprise network with the end-to-end quality of service (QoS) that your users demand? Find out about the latest QoS offerings for ATM, Ethernet and IP networks and the trade-offs for each. The moderator of this session will be Surya Panditi, president and CEO of Avici Systems. Panelists include Stan Hanks, vice president of research and technology for Enron Communications, and Vab Goel, director of IP network engineering and advanced technologies at Qwest Communications.

3:30 p.m. to 4:45 p.m.

WHAT PARTS OF E-COMMERCE SHOULD YOU CONSIDER OUTSOURCING?

Unlike brick-and-mortar stores, where you want to own the whole operation, the best way to get an e-store up and running is often to let someone else manage some of the back-office functions. This panel of electronic commerce experts, led by consultant David Strom, looks at the pros and cons of outsourcing such functions as payment processing, Web server hosting, shopping cart management and catalog fulfillment. Panelists include Tom Saichek, director of operations at Remedy Corp., and Martin Roscheisen, CEO of eGroups.

Thursday, Sept. 16

10:15 a.m. to 11:45 a.m.

IS NT AS NETWORK-READY AS LINUX?

Windows 2000 (formerly known as Windows NT) and Linux will be pitted against each other in this session, which will discuss the pros and cons of each network operating system (NOS). Which NOS is better in terms of reliability and performance? Ask network managers who have

deployed both systems: Percy Young, manager of store systems for Burlington Coat Factory, and Michael Krieger, vice president of PC servers at Hitachi Data Systems.

12:30 p.m. to 2 p.m.

HOW FAR DO WE PUSH GIGABIT ETHERNET?

What's the future for high-speed Ethernet? Find out at this session, which features Bruce Tolley, vice chairman of events for the Gigabit Ethernet Alliance; Jonathan Thatcher, vice president of product marketing for Picolight; and Douglas Ruby, vice president of product marketing at Lucent. The presenters will talk about how Gigabit Ethernet is being deployed in LANs and metropolitan-area networks and whether it makes sense to bump up the speed of Ethernet to 10G bit/sec.

9 a.m. to 5 p.m.

VoIP DAY

This special one-day program is designed to give network managers and designers practical information and lab-based demonstrations about integrated voice and data networks. Individual sessions will cover standard telephony, digital telephony, compression and transport methods. Additional sessions will help you design and implement an integrated network that meets your company's needs. The session will be moderated by Tom Byrnes, a principal with Byrnet. The day costs \$595. If voice over IP interests you, check out the VoIP Partner Pavilion on the show floor, which will feature the latest products in this area.

Must See

Switch special

What's it going to cost you to get wire speed out of your LAN switches? Do you need to know whether competing vendors' switches will really work together on the same enterprise network?

This N+I session — called LAN Switch Performance and Interoperability: Update on the State of the Art — is sponsored jointly by *Network World* and The Tolly Group. The session will offer up some insights into both of these crucial areas.

The Tolly Group/Network World 1999 SwitchMetric program has put more than 20 switches from a dozen vendors to the price/performance test. Tolly Group President Kevin Tolly and *Network World* Editorial Director John Gallant will discuss how the numbers were arrived at and how they can factor into your buying decision.

The session will run from 3 to 4 p.m. on Wed., Sept. 15, in Room 214E of the Georgia World Congress Center.



Network World's Convergence Showdown

When: Tuesday, Sept. 14, 12:30 p.m. to 2 p.m.

Where: Ballroom 1 of the Georgia World Congress Center.

Forget the marketing presentations and come hear the real strategies behind network convergence at Network World's

Convergence Showdown. In this presidential-style debate, vendor executives will face tough questioning from a panel of industry experts who've heard all the convergence hype and can ferret out the truth. Vendor executives will include:

- 3Com: Bob Roman, director, business development — emerging technologies.
- Cabletron: Romulus Pereira, chief operating officer.
- Cisco: Marthin DeBeer, a director of enterprise convergence strategy.
- Lucent: Karyn Mashima, strategy vice president and chief technical officer.
- Nortel Networks: T.J. Fitzpatrick, president of voice solutions/enterprise solutions.
- Vertical Networks: Scott Pickett, chief technology officer

Our expert panel includes *Network World* Senior Editor and showdown veteran Jim Duffy; Jim Metzler, a principal of Ashton, Metzler and Associates; and Kevin Tolly, president of The Tolly Group. The session will be moderated by *Network World* Editorial Director John Gallant.

After scrutiny from our expert panel, the vendors will question one another and the audience will get a chance to ask their own questions.



Strategic Network Storage. Take a closer look.

Laying the Foundation for Strategic Network Storage

Storage used to be so easy. Sure, files grew pretty fast, but a few more big drives usually licked the problem. Now video, animation, images, rich documents and HTML are all overloading your best laid storage plans. And it's only going to get worse. You need to think about your storage needs and capabilities in a new way — a strategic way.

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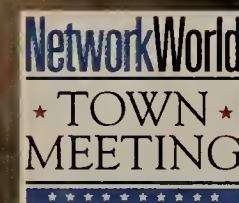
- Learning about the stress that the rapid growth in storage is putting on your IT staff, and why business as usual just won't cut it
- Finding out how a storage-centric plan can boost your entire IT infrastructure
- Discovering the key criteria — scalability, flexibility, robustness, and manageability — that should guide the storage decision-making process
- Learning what products and services are available today that can help you build a storage system for tomorrow
- Quizzing key vendor executives about product features and plans for the future
- Figuring out which vendors are most in sync with your long-range storage needs

Moderators

Doug Barney, Executive Editor of News, Network World

David Hill, Senior Analyst, Storage and Storage Management, Aberdeen Group

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Choosing a launch commander

Venture capitalists reveal what qualities they look for in the executive who will lead a start-up team.

BY CHRIS NERNEY

You've come up with a brilliant idea to solve your company's troublesome network problem, and you're ready to turn that idea into a hot start-up that could be the next Cisco or Microsoft.

The venture capitalists are interested — very interested. They like the technology, they like the market opportunity and they like — well, they may like you, too, but that doesn't mean they think you're the right person to lead the start-up to a big payoff down the road.

Many venture capitalists show great faith in an inexperienced founding team, while others lean toward importing veterans to run the show.

"In a perfect world, everybody wants the person who has done it before, the person who is financeable," says Charles Potachi, an IT recruiter at Heidrick & Struggles/Fenwick Partners, a Chicago executive search firm that works with numerous venture capital funds seeking top high-tech talent.

But a severe shortage of experienced, high-level talent in the IT industry has left venture capitalists operating in a less-than-perfect realm.

"It's actually rare to find a CEO who has the complete game," says Warren Packard, a director at venture capital firm Draper Fisher Jurvetson in Redwood City, Calif. "You're definitely going with people whose résumés don't scream out 'CEO.'"

Short of that ideal candidate — someone, say,

who has guided a start-up from a Silicon Valley garage to the Nasdaq ticker — venture capitalists most often cite three characteristics that are critical to successful high-tech start-up CEOs:

- Leadership skills.
- Domain expertise, or a clear understanding of the target market or technology sector.
- An indefinable spark that sets a handful of candidates apart from the rest of the pack.

"Someone with leadership skills has the ability to articulate the company's vision to his employees and the outside world, to create a shared vision," says Promod Haque, general partner at Norwest Venture Partners in Palo Alto.

To Packard, "a leader is someone who can leave for a week and the company keeps going. Also, it's someone who can really hire and really motivate. You want 'A' people hiring 'A' people."

Of course, having a top executive with industry-specific experience also is helpful for recruiting talent because the executive comes with a network of qualified potential employees, Haque says.

Bill Hulley, general partner and co-founder of Adams Capital Management in Sewickley, Pa., says his firm emphasizes domain knowledge over high-level industry experience or name recognition.

"Our CEOs and senior managers have always been first-timers," he says. "We think it's possible for someone to learn how to be a CEO."

Susan Mason, a venture investor at Onset Ventures in Menlo Park, Calif., agrees, but she warns that it's important to recognize when the founders are in over their heads. "One of the worst things that can happen to a company is a CEO trying to learn on the job," she says.

To cut down on the learning curve, Mason's firm likes to determine a start-up's business model before finding a chief executive.

Onset also looks for people who can turn on a dime. Moreover, the company wants independent thinkers. "We're looking for the maverick, the guy

who's a little bit weird," Mason says. "You want that sparkle, that essence."

Packard calls that essence "the cult of personality." Steve Jobs, for example, has a personality. He has a unique ability to sell a vision."

Mason and Packard say that if their venture firms decide a portfolio company needs outside talent, it's important to find someone who brings in complementary skills. "If your founding team has great engineering backgrounds but no marketing experience, then we try to bring in a super marketing person," Mason says.

Then there's the matter of personalities.

"A lot of it has to do with chemistry, with how the new CEO will blend with the existing team," Hulley says.

And while inexperienced founders may be able to grow with a brand-new company, a start-up that is well down the road toward an initial public offering may need someone with a proven track record on Wall Street.

Nerney is a senior analyst at Internet.com, a Web site for Internet professionals. He can be reached at cnerney@internet.com.

More Online

- Find out how tough it is to recruit executive talent today.
- Check out our quarterly venture capital surveys with PricewaterhouseCoopers to see which type of network companies get the most dough.





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Responsible for the design, engineering, and implementation of a customer data network. Requires in-depth expertise in one or more specific data networking products or services such as Multiprotocol Networking, Internet/VPN Solutions, or Carrier Services Engineering. The area of specialization must include direct hands-on implementation experience and industry or vendor certification. Specific areas of technical expertise include Router Networking (Cisco/Bay Networks), Networking Protocols (IP/OSPF, SNA), and Networking Services (ATM, Frame Relay, ISDN PR/BRI).

Integration Engineer

Responsible for the specification and documentation of all physical and logical details for a network location. Requires in-depth knowledge of the physical attributes of networking hardware and familiarity with networking services and networking equipment (multiplexers, CSU/DSUs, modems) for interfacing to Network Services. Also requires knowledge of data center design, equipment

testing and installation practices; attention to detail; and excellent PC skills; 3+ years of industry experience and an Associate's degree in a technical field or equivalent industry training preferred.

Systems Architect

Individual serves as the technical team leader for the design, engineering and implementation of Enterprises Data Networks, and has overall technical responsibility for delivery of the solution from project inception through the transition of life-cycle. Candidates must have a broad understanding of networking technologies and customer network applications, and in-depth expertise in one or more specific data networking products or services such as Multiprotocol Networking, Internet/VPN Solutions, or Carrier Services Engineering. The area of specialization must include direct hands-on implementation experience and possible industry or vendor certification. Good presentation skills are required; 8+ years of industry experience; and a BS/MS degree in Computer Science or Engineering is preferred.

Network Engineers

Apply your data networking skills by designing, testing, and documenting router-based solutions. Develop LAN interconnect solutions/offers using Cisco or Nortel (Bay Networks) router, LAN operating systems and protocols, AT&T WAN and/or IP services, and modems/DSUs/multiplexers. Must understand new software and hardware features and/or releases from router vendors developing solutions. Candidates will obtain customer requirements, plan and build lab test environments, perform tests, document solutions, and train technical team members and work center support personnel.

Tier III Technical Engineers

Requires 3-5 years WAN maintenance & implementation experience; CSU/DSU familiarity; a BS degree; and extensive experience with IOS configuration & upgrade; Cisco/Cabletron/Bay Networks, and IP routing on Cisco products (in a X.25 switched network).

Tier II Technical Engineers

Requires 2+ years LAN/WAN experience; a BS degree; 1 year experience IP routing on Cisco products; and experience with IOS configuration & upgrade and Cisco/Cabletron/Bay Networks. A UNIX background is a plus. Knowledge of HP Openview and Network Node Manager is beneficial.

Tier II/III Voice Engineers

Requires the ability to manage multiple vendors, maintenance contracts, billing and escalations in a reactive environment. Strong organizational and escalation skills are required to coordinate with AT&T Network Management Centers in support of AT&T client global transport network (VTNS, 800 service). Knowledge of network services must be complimented with an in-depth understanding of PBX Move, Add and Change (MAC), PBX features, manual ring down circuits, T1, private lines over IDNX, & CSU/DSUs. Understanding of Lucent Technologies (Definity) router (3Com, Cabletron, Optivity, Nortel, Octel) an added plus.

Systems Analyst

Position requires an Analyst with systems administration skills. Responsibilities will include administration & day-to-day duties involving:

Software

- UNIX system administration - UNIX - NT & HP-UX software installation
- UNIX shell - HP Network Node Manager 4.1 - HP IT/Operations - MicroSoft Windows
- X Windows - Application Administration

Hardware

- HP 9000/7xx workstations - Sun Sparc - Desktop Workstations (PCs running Windows NT) - HP 9000/8xx Servers

Others

Performance management - Problem-solving and decision-making - Basic LAN/WAN networking concepts - Participates in weekly rotation of **24x7** on-call pager

Voice Associate

Candidate will administer/troubleshoot hardware/software issues for PBX's, voice mail systems, computer telephony integration, and voice response issues. Responsibilities also include managing vendors such as Lucent Technologies, Moves, Adds, Changes provisioning requests. Candidate should have experience with T-1/T3 transport and ISDN.

Network Engineer

Candidate will provide high level support of networks on Cisco and Bay routers as well as advanced troubleshooting on frame relay, HP Openview, IPX, SNA, ISDN. Candidate must have project management experience and be able to interface with client.

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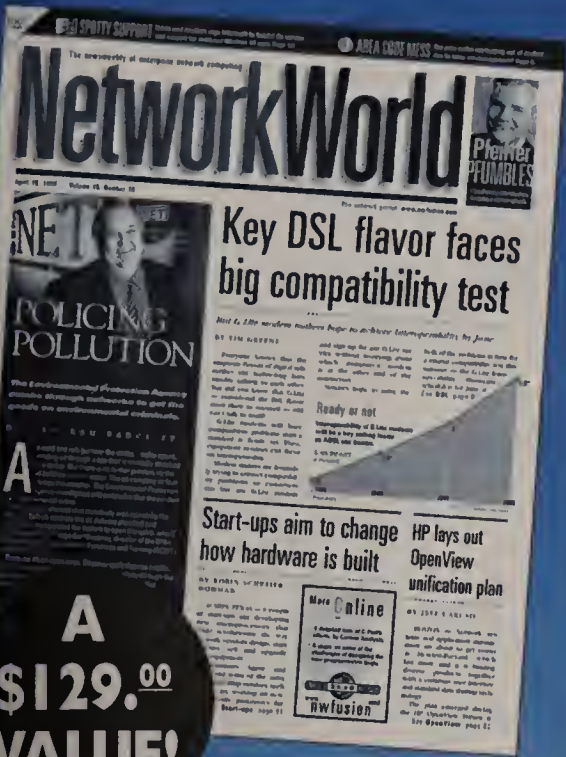


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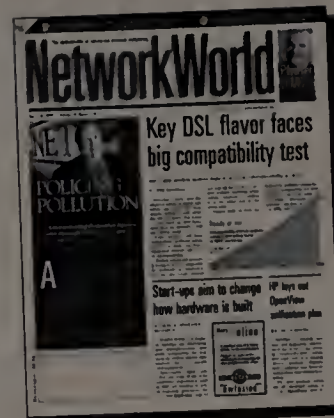
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► **BUSINESS DEVELOPMENT EXECUTIVE**

You'll sell telecommunications network services to multi-national clients. To qualify, you need a BS/BA, or equivalent, and 8-10 years' telecom field sales experience. You also need excellent communications skills and knowledge of LAN/WAN support applications, frame relay, ATM and legacy protocols.

► **ACCOUNT MANAGER**

You'll manage current customers and develop new customer accounts. To qualify, you need a BS/BA, or equivalent, and 4-6 years' telecom account management experience.

► **BUSINESS SUPPORT ENGINEER**

You'll provide technical solutions, proposals and pre- and post-sales support to business development staff. To qualify, you need a BSEE or BS in telecommunications and/or 7 years' technical sales support experience. A strong account planning background and an understanding of networking protocols including frame relay, LAN/WAN, ATM and internetworking technologies is required.

The above positions are available in Mission Viejo, CA; San Francisco, CA; Seattle, WA; Chicago, IL; Cleveland, OH; Denver, CO; Boston, MA; Hartford, CT; New York, NY; Washington, DC; King of Prussia, PA; Atlanta, GA; Houston, TX; Dallas, TX; and Montreal, Canada.

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Senior Network Architect

Will be responsible for the implementation of modeling, performance, and capacity planning functions within global multi-protocol networking environments and providing consultation, project management, technology review and telecommunications design in LAN, WAN, remote computing, infrastructure and industry standards. Position requires 5-10 years' related industry experience with multiple platforms experience.

Network Analyst

Will be responsible for multi-protocol LAN and WAN design/support projects. Position requires experience in TCP/IP, IPX, Appletalk, Ethernet, Token Ring, FDDI, ATM, Routers, Bridges, plus Network Management Tools (HP Openview, SunNet Manager, Netview 6000, Network General Sniffer), and experience with DNS and QIP.

Security Consultant

Will provide analysis of the current customer security environment and make recommendations to improve the security posture for Fortune 1000 companies. You will also provide consultation, project management, and recommend security tools for remote computing security (such as VPN and cryptographic solutions).

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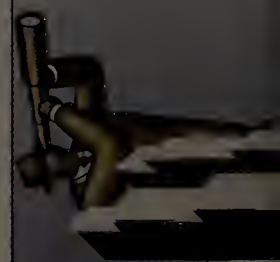
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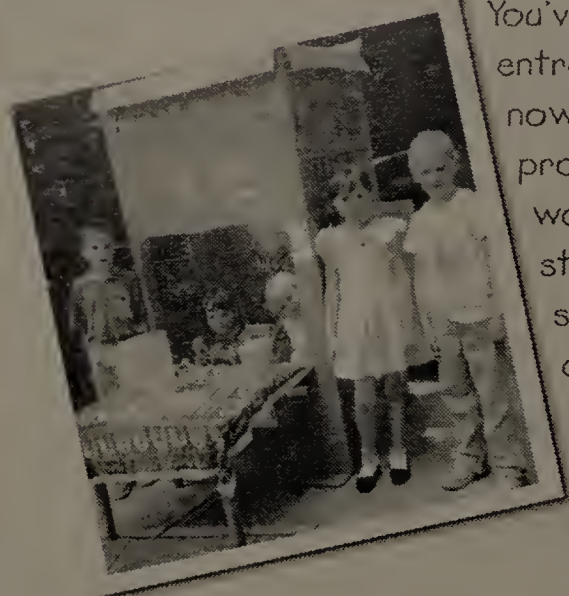
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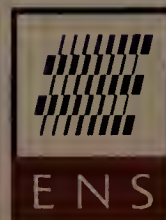
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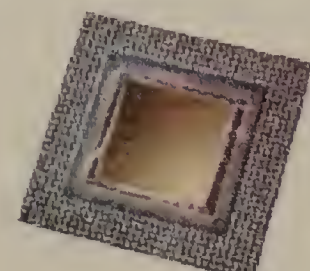


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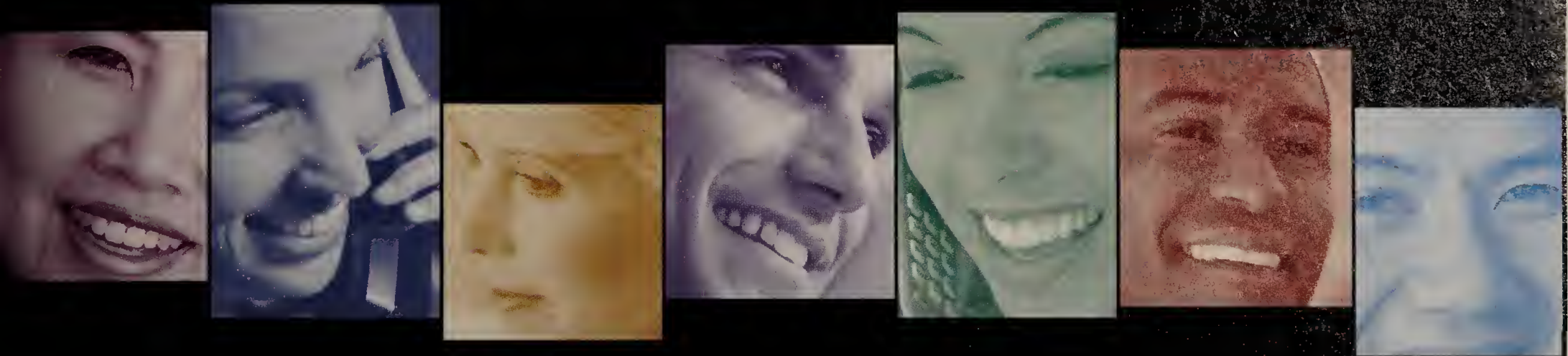
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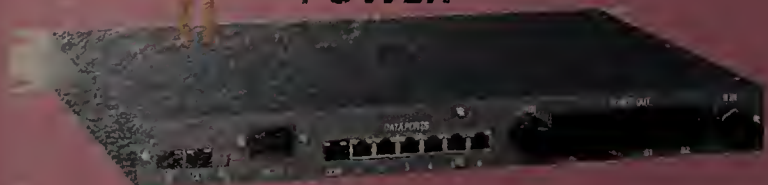
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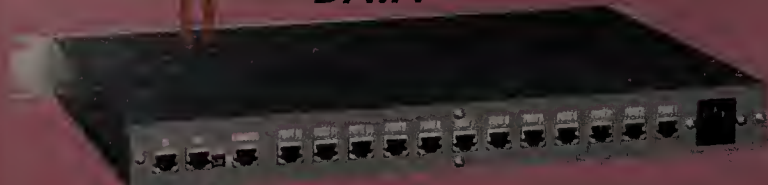
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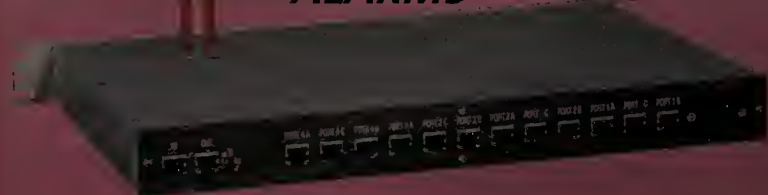
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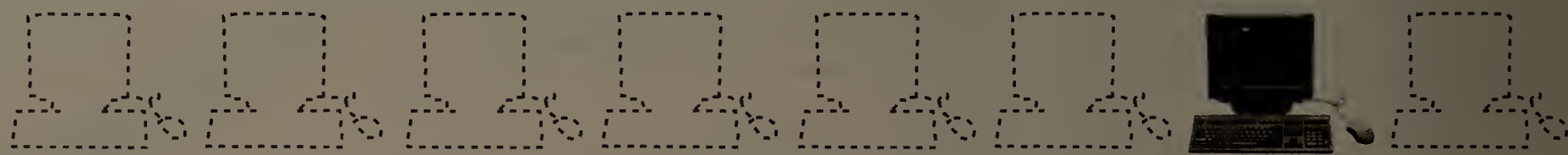
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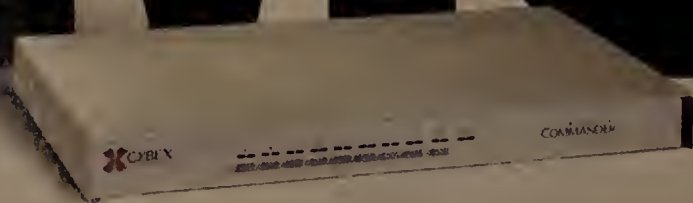


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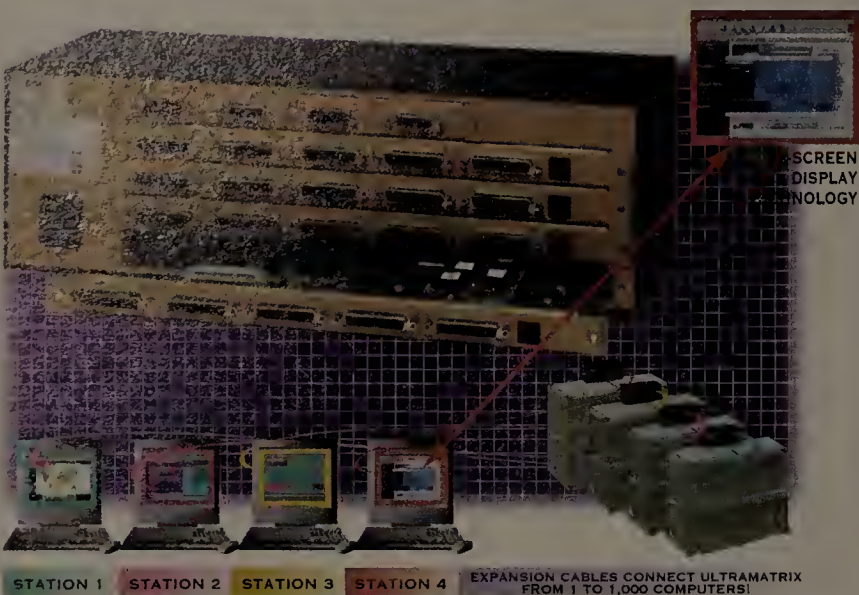
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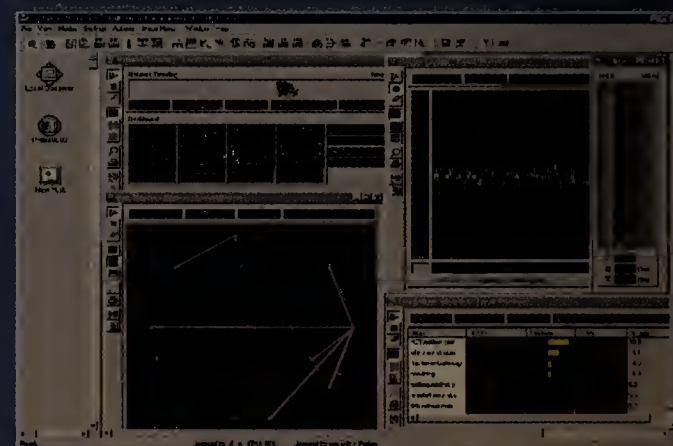
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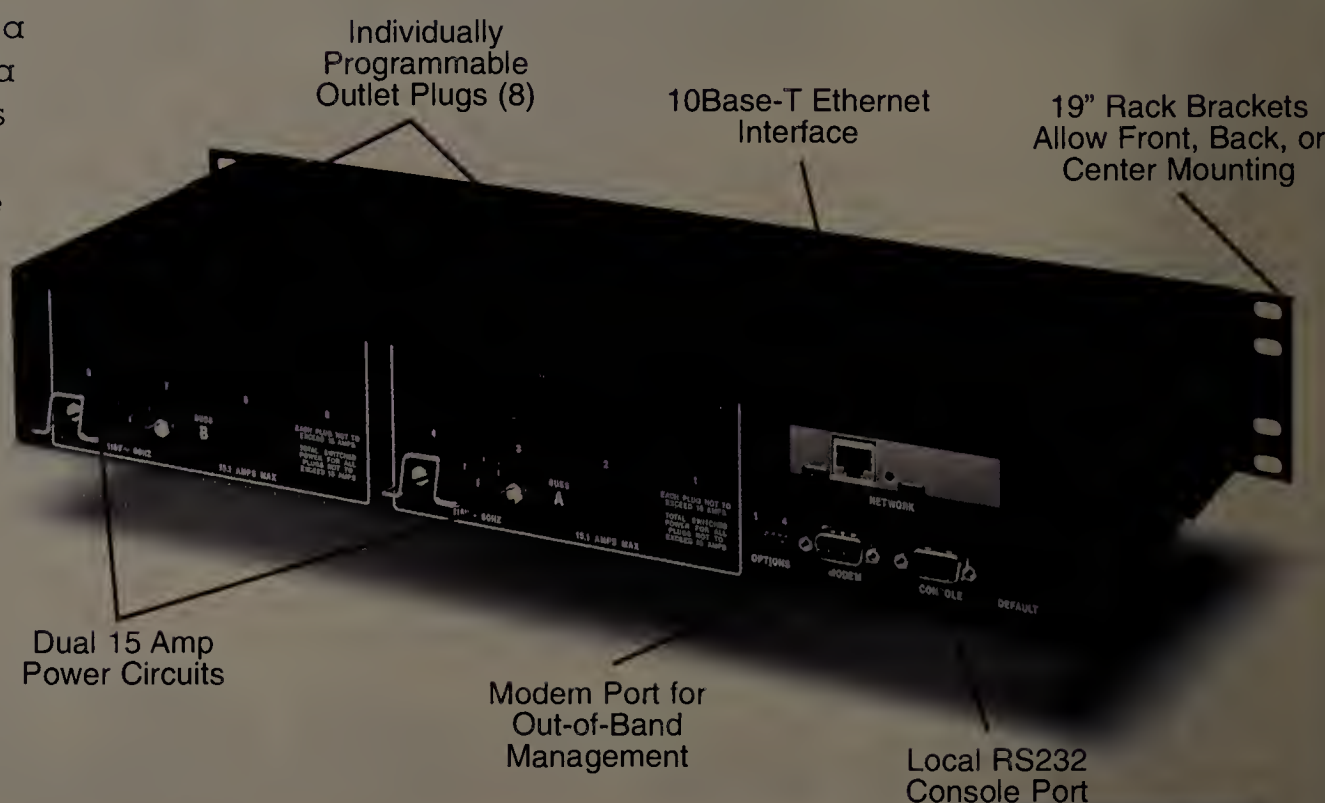


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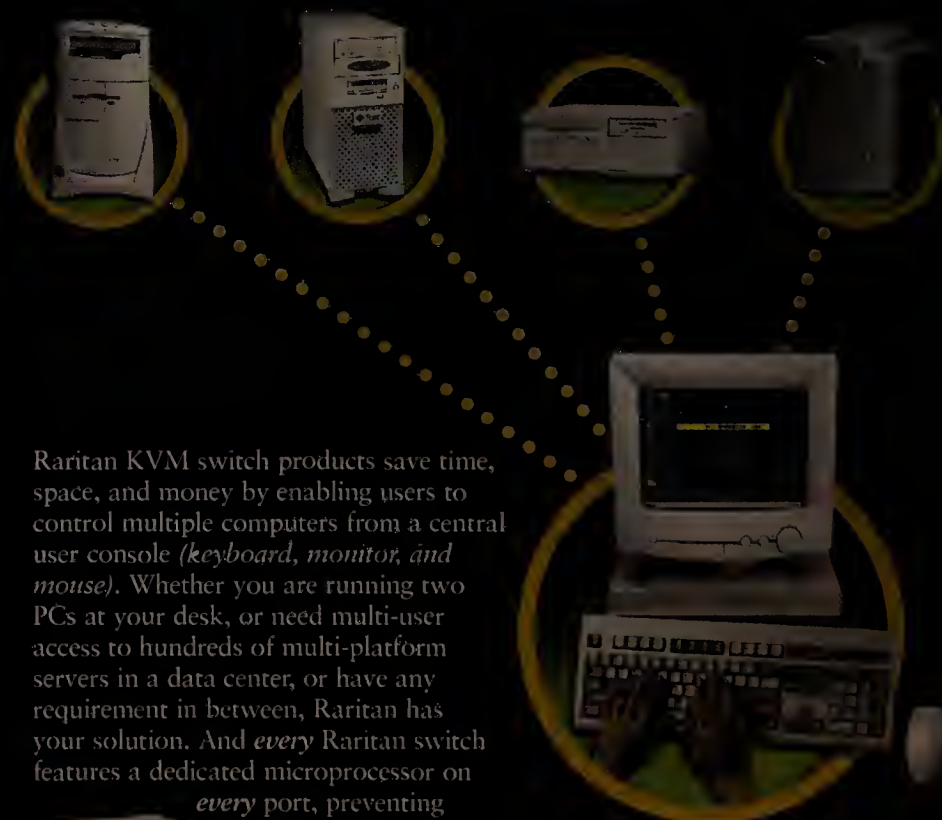
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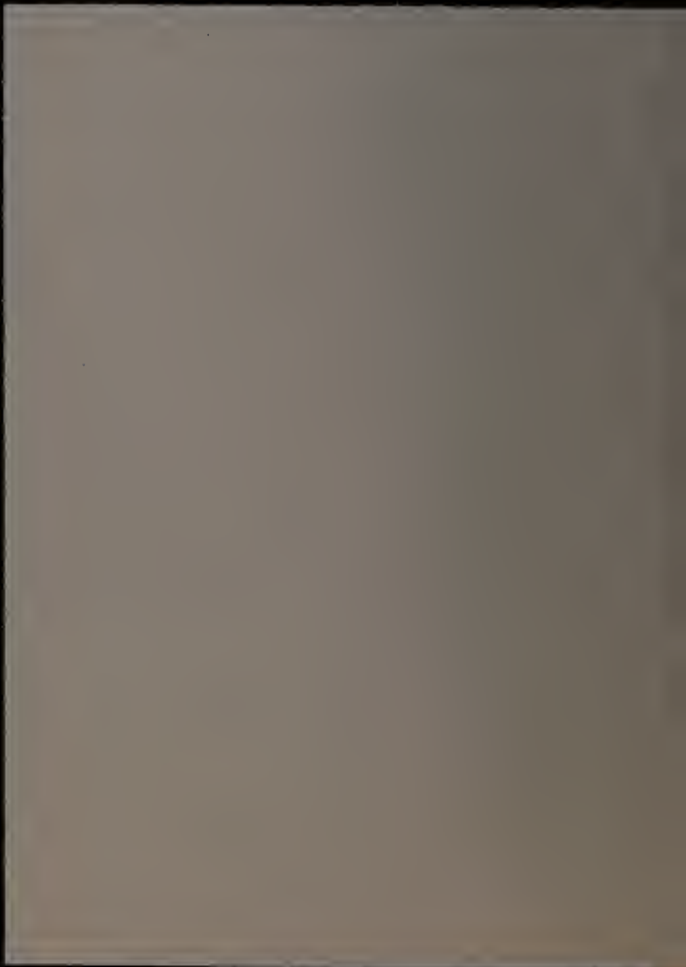
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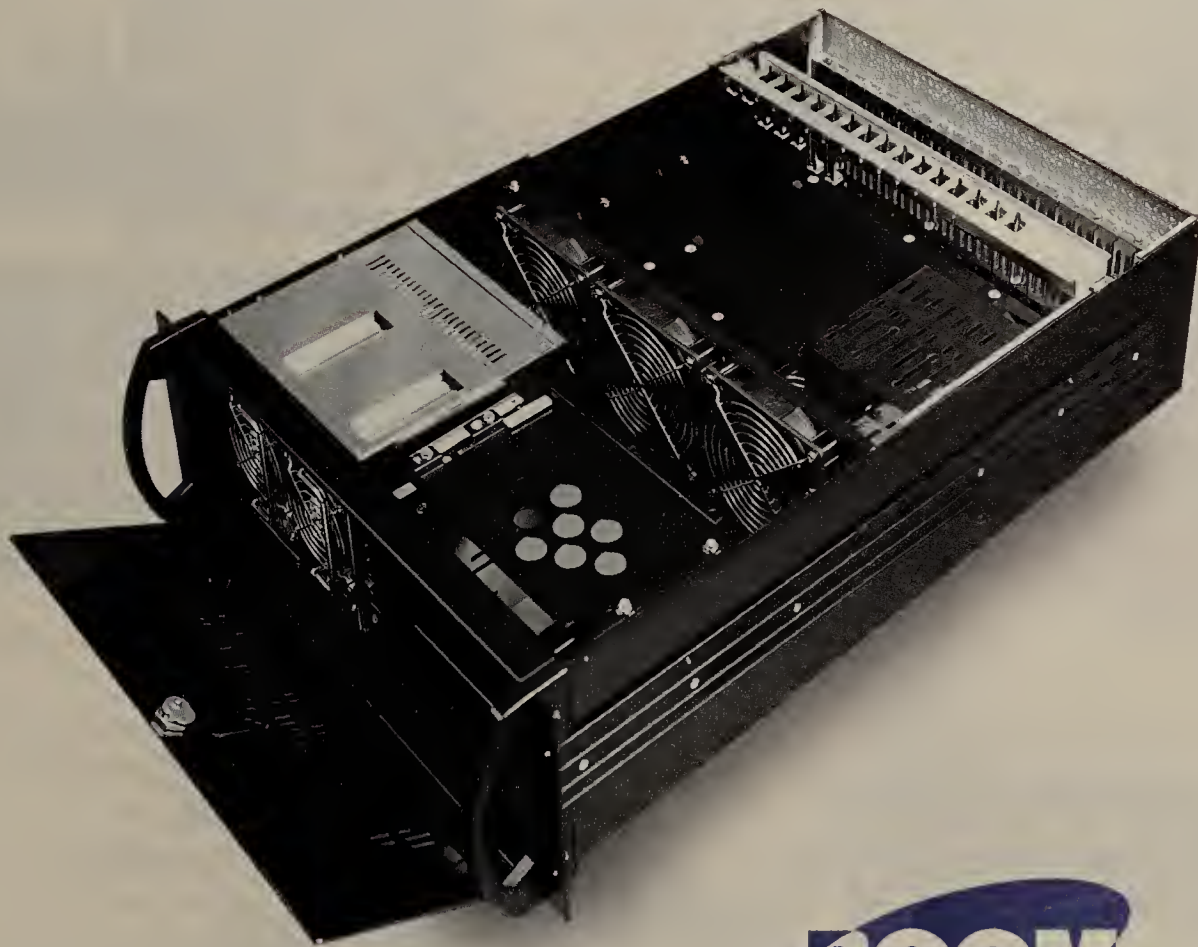
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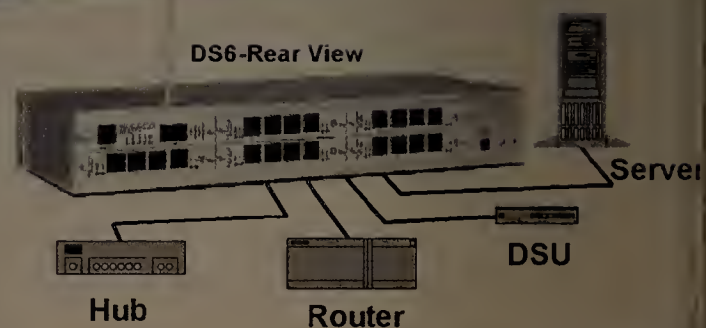
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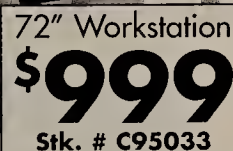
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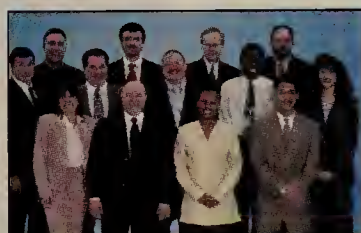
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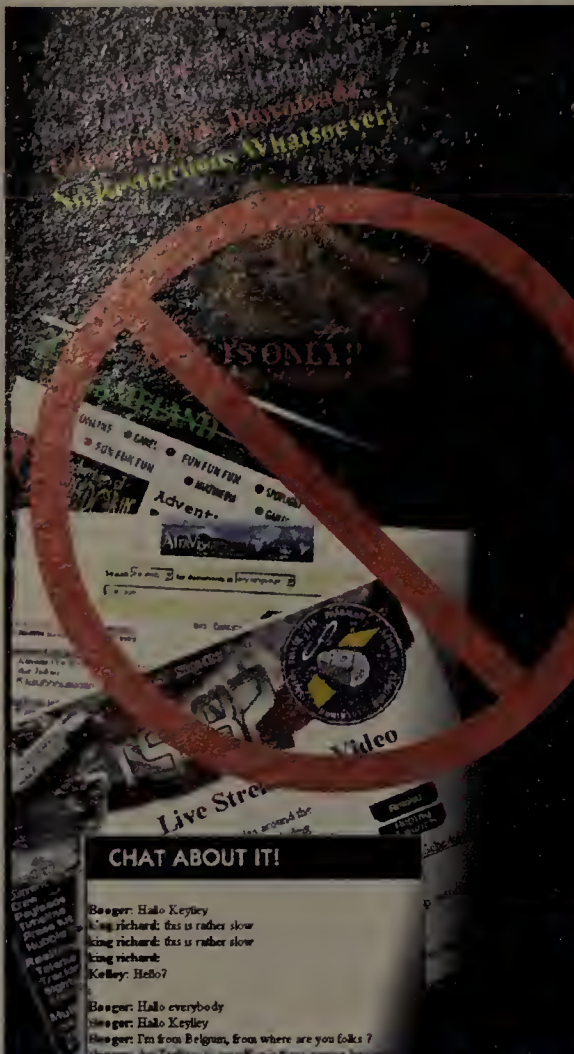


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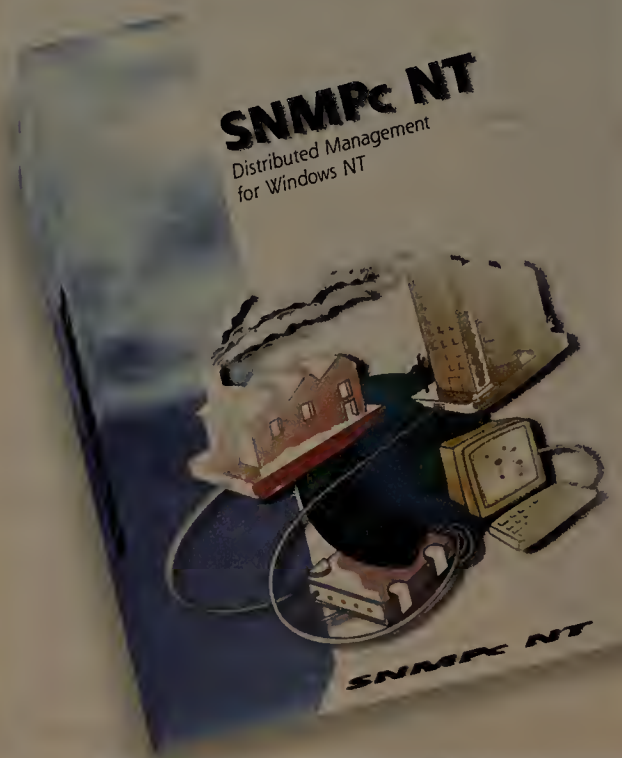
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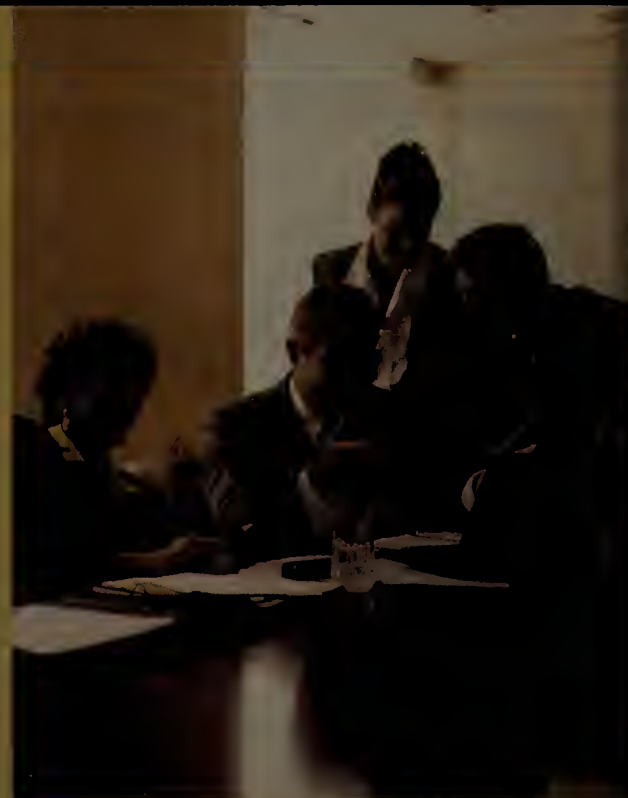
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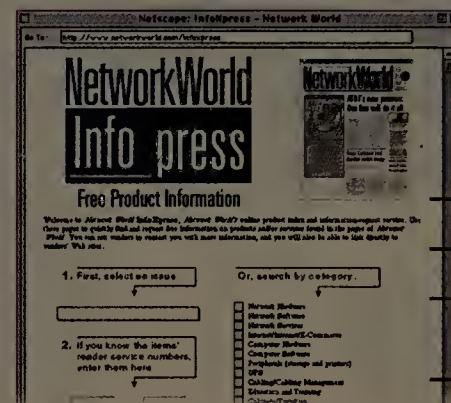
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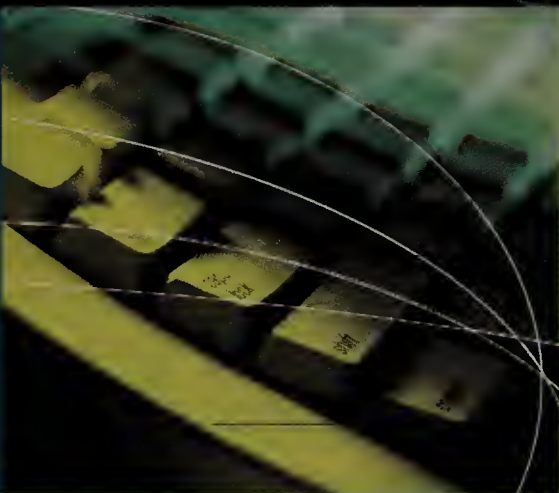
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By Sam Sekhavaty

Since our introduction of the world's first automatic printer sharing switch, the first pocket print server, and the first Keyboard, Video, Mouse (KVM) switching system, Rose has designed and manufactured a wide variety of innovative switching and sharing solutions. Whether you need to share or consolidate your KVM's, share a printer or other peripheral, Rose has a product to fit your needs.

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Rose has an impressive and diverse list of customers and applications; they include Fortune 500, SOHO, Commercial, Industrial, Educational, Government, Military, and OEM. Aside from use in classic office, server room environments, video walls, and training rooms, Rose products are used in a wide variety of other applications and are installed throughout the world. You can find our products in use on board ships, trains, and aircraft.

Our customers depend upon Rose products in solving the most diverse and robust application needs. Our systems expertise combined with our customers' application needs create new and innovative uses for our products everyday. Our OEM program supports private labeling and / or the development of custom products to meet specific application needs.

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- Multiplexing hog and cattle scales at animal auctions
- Censoring and controlling live video feeds at television stations
- Controlling access to 911 emergency consoles in hundreds of cities
- Switching consoles in telecommunication racks
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Our Product Lines

Our product line encompasses three main areas: 1) Serial, Parallel and Code Activated Switches; 2) Printer Sharing Devices; and 3) Keyboard, Video and Mouse (KVM) products. The KVM product line is richly diverse, with many products for sharing, extending and splitting. Our featured KVM products are UltraMatrix™, CrystalView™ and MultiStation™.

UltraMatrix™

Allows up to sixteen users access as many as 1000 servers!

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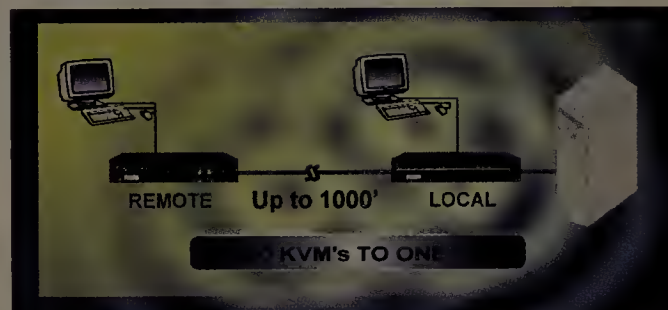
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The CrystalView™ is available in two models. The single



CrystalView™

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Sales Offices

Carol Lasker, Associate Publisher
Debbie Lovell, National Sales Operations Manager
Internet: clasker, dlovel@nww.com
(508) 875-6400/FAX: (508) 879-5760

NEW YDRK/NEW JERSEY

Tom Davis, Advertising Director/Eastern Region
Elisa Della Rocco, District Manager
Internet: tdavis, elisas@nww.com
Aimee Jacobs, Sales Assistant
(201) 587-0090/FAX: (201) 712-9786

NORTHEAST

Donna Pomponi, Senior District Manager
Kevin Gasper, District Manager
Internet: dpomponi, kgasper@nww.com
Linda Bishop, Sales Assistant
(508) 875-6400/FAX: (508) 879-5760

MID-ATLANTIC

Jacqui DiBianca, Senior District Manager
James Kalbach, Account Executive
Internet: jdibian, jkalbach@nww.com
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(610) 971-1530/FAX: (610) 975-0837

MIDWEST/MARYLAND

Eric Danetz, District Manager
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(201) 587-0090/FAX: (201) 712-9786

CENTRAL

Dan Gentile, Midwest Regional Manager
Internet: dgentile@nww.com
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(512) 249-2200/FAX: (512) 249-2202

NORTHERN CALIFORNIA

Sandra Kupiec, Advertising Director/Western Region
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Lara Greenberg, District Manager
Sean Weglage, District Manager
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Katherine Marceau, Sales Operations Manager
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(408) 567-4150/FAX: (408) 567-4166

NORTHWEST/ROCKIES

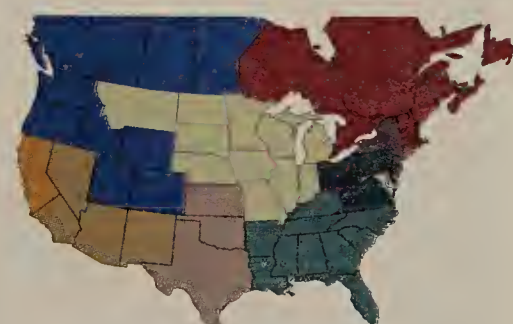
Carol Stiglic, Senior District Manager
Karen Weiss, Senior District Manager
cstiglic, kweiss@nww.com
(408) 567-4150/FAX: (408) 567-4166

SDUTHWEST

Rachel Gillis-Swartz, Senior District Manager
Becky Bogart Randall, District Manager
Internet: rschwartz, brandal@nww.com
(949) 250-3006/FAX: (949) 833-2857

SDUTHEAST

Don Seay, Senior District Manager
Internet: dseay@nww.com
Terry Sanders-Prentice, Sales Assistant
(770) 394-0758/FAX: (770) 394-6354

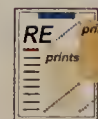


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AVVID,
continued from page 1

to assist customers that want to build integrated voice and data networks

Cisco has been playing the voice/data convergence game for a while (NW, Jan. 27, 1997, page 1), but AVVID is the first clear strategy for melding the firm's disparate packet-telephony products into a cohesive whole, observers say. Indeed, Cisco is expected to play up the fact that AVVID products are available and deployable now, while multi-product convergence suites from Lucent and Nortel won't be fully available for another year. Nortel announced its 11-product Internet Communication Architecture in June; Lucent announced a nine-product roadmap in May (NW, June 14, page 8).

Among the products on which AVVID will be based are:

- Amteva's IP-based Unified Communications middleware, which consolidates voice mail, e-mail and fax on a single IP network.

- Calista's offerings, which let legacy digital phones interoperate with voice-enabled switches and routers.

- GeoTel's software, which integrates enterprise data applications with PBXs to deliver integrated data and voice to call centers over the Internet or public switched telephone network (PSTN).

- Selsius' network PBX systems for IP-based telephony.

Cisco will also roll out at least four new products under the AVVID umbrella — a call processing server, two packet/PSTN gateways and a new version of the Selsius Call Manager software, according to sources.

Cisco declined to comment on AVVID.

A key component of AVVID is the Media Convergence

AVVID adventures

Cisco's new convergence products include:

MCS 7830: Fault-tolerant call-processing server for Call Manager applications.

DT-24+: PCI gateway for T-1 ISDN connectivity between packet- and circuit-switched nets.

DE-30+: PCI gateway for E-1 ISDN packet/circuit connectivity.

Call Manager 2.4: Software for "Single Button Collaboration" over Voice-over-IP networks.

Server (MCS) 7830. The MCS 7830 is a fault-tolerant, rack-mountable server for Cisco's Selsius Call Manager software. The MCS 7830 is designed to ensure high availability, reliability and scalability of converged voice/data networks.

The MCS 7830 is based on a 500-MHz Intel Pentium III processor and features 256M bytes of static RAM and up to 109.2G bytes of internal storage through six SCSI hard drives.

The gateways are called the DT-24+ and the DE-30+. Both are PCI bus-based cards for PCs that connect the AVVID packet telephony network to the PSTN or a PBX through ISDN Primary Rate Interface trunks.

The DT-24+ is a T-1 version of the gateway and supports 23 simultaneous voice-over-IP calls. The DE-30+ is an E-1 version that supports 30 simultaneous voice-over-IP channels.

The new Call Manager software, Version 2.4, features a so-called "Single Button Collaboration" capability. This feature lets users on AVVID IP phones collaborate on a single project or document by pushing a button on the handset.

Call Manager 2.4, which appears to be the glue that bonds the AVVID framework together, will also feature tighter integration with the Amteva and GeoTel products, sources say. Ostensibly, this will let users manage the functions of Amteva and GeoTel products from a Call Manager system.

Still missing from Cisco's convergence architecture are port modules for the Catalyst LAN switches that would let users connect the switches to analog phones, fax machines, key systems, PBXs and off-premise sites, such as telephone company central offices. Analysts also note that Cisco needs to spin a compelling story on why users should give up the security of their tried-and-true, feature-rich PBXs for what Cisco calls the "New World" of packet telephony.

"For the guy who wants to retain the comfort and safety of circuit-switched voice services, Cisco needs to be able to say 'We can accommodate you,'" says one analyst who requested anonymity. "They're not quite there yet."

Pricing for the new products was not available at press time. ■

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Novell,

continued from page 1

a support contract with Novell Consulting Services will be necessary for that configuration. The company will ultimately support up to 32 servers.

Microsoft Cluster Server (MSCS), on the other hand, supports only two identical servers. Windows 2000 DataCenter, which will not ship until the second quarter of 2000, clusters up to four servers.

Neil McDonald, an analyst with the Gartner Group, believes the software will give users a reason to stay with NetWare or migrate from a previous version of NetWare. The product will provide greater fault tolerance than MSCS, Standby Server for NetWare or SFT Level III, a Novell version of fault-tolerance software available for NetWare 3 and 4.

NetWare Cluster Services also has two other gaps, McDonald says. It does not allow clustering as a single system image (SSI), and it requires Novell Storage Services (NSS), a technology that lets the server come up and load data quickly. SSI allows the consolidation of system and application resources into a unified view across all clustered servers so they operate as a

Web server failover

In NetWare Cluster Services for NetWare 5, users can assign applications to fail over to specific servers.

3 Traffic is rerouted to the failover servers. When Web server 1 has been repaired, Web sites A and B will automatically return to it.

single system, improving availability and reliability. Novell may support SSI in its next release, the company says.

Julian Smith, director of IS at Memphis advertising agency Thompson & Co., is a NetWare 4.1 user who is attracted to clustering on NetWare 5 and is considering migrating. "We have agency management software running on several servers that must always be up, as well as a GroupWise messaging system," Smith says. "Clustering these to protect them is as good a reason as any to upgrade to NetWare 5."

Travis Berkley, LAN supervisor at the University of Kansas, has hundreds of users accessing payroll and human resources applications. These file-and-

print applications "require a high degree of fault-tolerance and must always be available," says Berkley, who also believes the new clustering software could be useful.

NetWare Cluster Services works with Novell Directory Services and has been tested with servers from Compaq, Dell, Hewlett-Packard and IBM. Each server in the cluster is active and connects to the network via an Ethernet hub.

The servers also join through a Fibre Channel hub or switch to a shared disk subsystem, which is a boon to Smith. "The ability of the server to share storage over Fibre Channel makes sense," says Smith, who has "oodles of storage that isn't accessible to all servers."

Extra security can also be maintained by implementing RAID Level 5, and storage can be dynamically allocated if required. Novell has tested NetWare Cluster Services with disk subsystems from Compaq, Data General, IBM, XIOTech and Dell.

Clusters can be managed with Novell's ConsoleOne, a utility that shows the status of the cluster, controls the configuration and is used for monitoring operations. When a node in the cluster fails, any node can take over applications and the cluster's resources as determined by the network manager during configuration.

In addition, servers using NetWare Cluster Services can

be load balanced, a feature that is increasingly important as Web servers are clustered to speed access to the Internet, according to James Gruener, an analyst at Aberdeen Group. Applications can also be moved from one server to another before failures occur or critical applications can be concentrated onto a small number of servers to allow protection from catastrophic server failures.

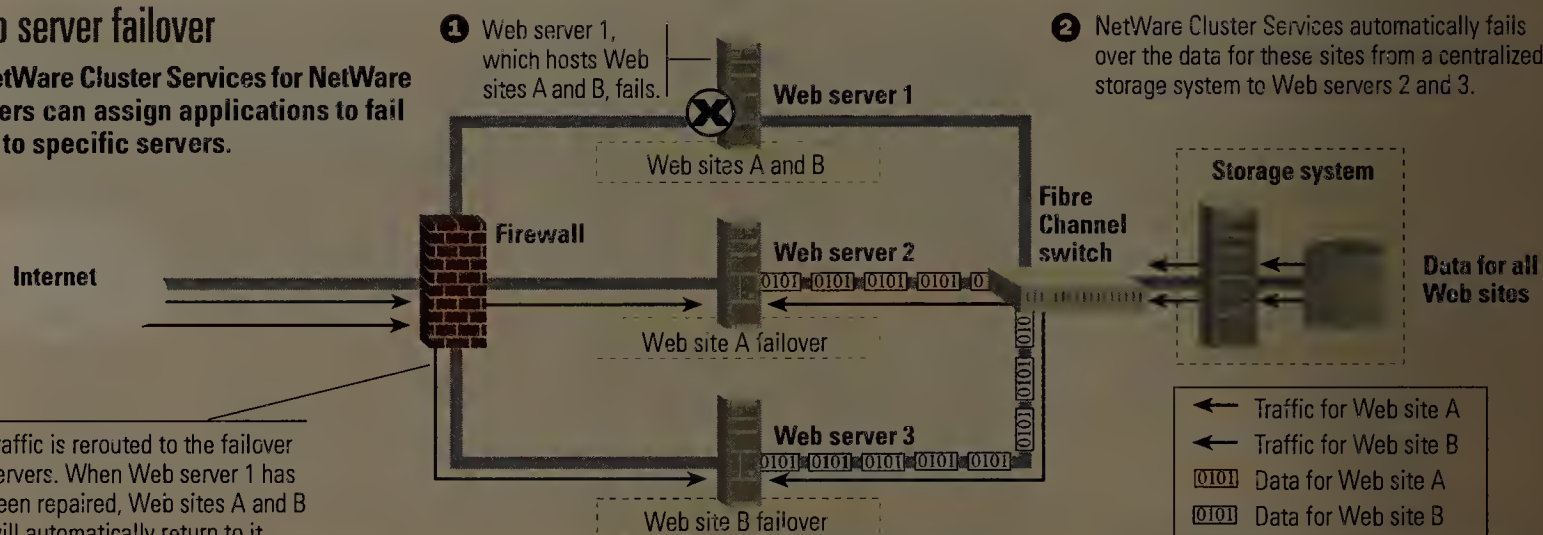
NetWare Cluster Services is installed on each clustered server and costs about \$5,000 per server.

Novell: www.novell.com

Get more info online.

DocFinder: 4636

www.nwfusion.com



Symantec bolsters Norton antivirus software

BY ELLEN MESSMER

CUPERTINO, CALIF. — Symantec this week will ship an upgrade to the corporate edition of its Norton Anti-Virus software that adds Novell NetWare support to what was formerly NT-only virus protection.

In addition, Symantec is beta-testing a management console for large-scale software management of desktops or servers using Norton Anti-Virus.

The Symantec System Center console will allow a network manager to centrally deploy Norton Anti-Virus software updates to hundreds of thousands of desktop users or servers, says Gary Ulaner, Symantec senior product manager. The current Symantec console is limited to 250 users and only works in an NT environment. With the new version, corporations won't have to use multiple consoles for mass deployment. Plus, the single console will manage NT and NetWare clients and servers.

Set to ship in October, the Symantec System Center console will periodically scan any computer running Norton Anti-Virus Corporate Edition 7.0 to ensure the machine is running the latest updates. Antivirus software, by necessity, is subject to update whenever dangerous new viruses are spotted.

Norton Anti-Virus Corporate Edition 7.0, working with the console, will include a "Quarantine Server," which can store suspicious files a user may receive

or those damaged beyond repair. From the quarantine, a network manager can dispatch the problem file via e-mail to Symantec's lab for review.

When the file is fixed, the Symantec

lab returns the file. Symantec calls this process "Scan and Deliver," and it's based on technology developed by IBM. Whenever a virus "cure" is created, this cure is made available to other Norton

Anti-Virus subscribers, as well.

Norton calls the entire antivirus software and console package the Norton Anti-Virus Enterprise Solution. Distributors typically price the package between \$6 and \$60 per node, depending on volume.

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Network World is distributed free of charge in the U.S. to qualified management or professionals.

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Copper,
continued from page 1

and an upcoming model in the Super-Stack line, according to a company spokesman. All these products will be available in the first half of next year.

Cabletron will demonstrate a one-port copper gigabit uplink for its SmartSwitch 6000 — due out at the end of the month — and a two-port module for the SmartSwitch Router, coming out early next year.

Intel says it will contribute a 1000Base-T adapter to the market. But the company insists it isn't announcing any copper gigabit products at the show and won't say when the adapter will ship.



The interoperability demonstration builds on the simple demos given at spring Interop. At that time, Alteon WebSystems, Extreme Networks and Alcatel-owned Packet Engines made separate efforts to show data transmitting at gigabit rates over copper. After many delays, Broadcom was able to deliver chips for the physical-layer interface so equipment vendors could put together prototypes. Now those chips are more widely available, but not in volumes large enough to ship products.

It is anticipated that Gigabit Ethernet-over-Cat 5 wires will primarily be used in server connections. The technology is expected to be less ex-

pensive and easier to install than Gigabit Ethernet over fiber optics.

"We'll definitely be looking at [copper gigabit] for server farms, but not for the backbone," says Phil Kwan, manager of network planning and operations for Incyte Pharmaceuticals in Palo Alto. The company has data-mining applications running on its servers that could use the bandwidth, Kwan says.

The availability of a copper version will give an added boost to an already growing market for Gigabit Ethernet, according to Infonetics Research in San Jose. A recent survey of 225 companies showed that 40% will implement Gigabit Ethernet in their backbones over the next 18 months and 19% will run the technology to servers.

One hurdle to deploying copper Gigabit Ethernet is that a lot of the existing wiring may not be good enough for Gigabit Ethernet, cautions Esmeralda Silva, research manager at International Data Corp. in Framingham, Mass.

Cat 5 wiring is popular, and that's part of the appeal of 1000Base-T. But the new standard pushes Cat 5 to its limit. If the wiring hasn't been installed up to specification, users may

"We'll definitely be looking at [copper gigabit] for server farms, but not for the backbone."

Phil Kwan, manager of network planning and operations, Incyte Pharmaceuticals



New ASP Agillion ready to talk services

BY DENISE
PAPPALARDO

AUSTIN, TEXAS — Secretive new application service provider (ASP) Agillion, one of the most talked about start-ups around, is expected to break its silence in the next couple weeks by disclosing plans for its first service.

Agillion has been the subject of much speculation since announcing its formation 12 months ago. The buzz has largely been in reaction to the company's well-known leaders: former Tivoli CEO Frank Moss and BSG Systems founder Steve Papermaster will serve as Agillion's chairman and CEO, respectively.

Papermaster last week was still tightlipped about Agillion's plans, such as service details and pricing, but he did share a few tidbits.

The company's first offering,

part of a line of what Agillion calls E-Services, will focus on customer relationship management (CRM), Papermaster says. The service, aimed at small companies, is scheduled to debut in the fourth quarter.

But unlike other ASPs, Agillion will not simply outsource traditional CRM applications, such as those from Siebel Systems. Rather, Agillion has designed its own CRM applications, which will be accessible via any Web browser.

Agillion also plans to differentiate itself by making it particularly easy to subscribe to its services. Business users will be able to sign up and set up billing for services through a Web-based portal site that Agillion is in the process of creating. Papermaster says monthly pricing will be based on the number of users that access each application.

Agillion plans to announce many partnerships with operators of Internet sites frequented by small businesses, Papermaster says.

Agillion initially will offer services through a single data center in Austin, where the company is based. Papermaster declined to detail what hardware and software platforms the company will use to support its services. Neither would he say whether Agillion has built its own data center or is collocating with another service provider.

Agillion has raised \$4.5 million in venture funding and employs nearly 50 people.

Jennifer Kula, a consultant at TeleChoice in Boston, says she wouldn't be surprised to see Agillion target specific vertical industries, such as health care and insurance, with its offerings.

Agillion: www.agillion.com



WHY CARE ABOUT COPPER GIG ETHERNET?

It has been difficult for vendors to work the kinks out of Gigabit Ethernet running over Category 5 copper wires, but experts think customers will benefit from the effort.

The main benefit will be cost savings. Vendors are expected to charge 25% to 50% less for equipment based on the copper version than they would for the fiber-optic counterparts. The low cost is expected to put pressure on vendors to lower prices for fiber-optic gear, as well.

Cat 5 wiring is the most popular cabling for enterprise networks, primarily handling Ethernet and Fast Ethernet. It makes sense, then, that the IEEE chose Cat 5 wiring to support Gigabit Ethernet.

Experts say copper-based Gigabit Ethernet initially will be used mainly to connect servers to network backbones, while the backbones will still use fiber-based Gigabit Ethernet. The copper standard — IEEE 802.3ab, or 1000Base-T — is limited to lengths of 100 meters, while fiber versions can stretch for tens of kilometers.

Some observers believe that in a few years, copper Gigabit Ethernet will make possible gigabit speeds to the desktop — but it's hard to find desktop applications today that could use that much bandwidth.

— Jeff Caruso

see some problems with the new technology.

"You don't even think about wiring, but it has to be true Cat-5 for Gigabit Ethernet to work," Silva says.

Some of the first products supporting the new technology were introduced last month. HP says it will ship a

module for its ProCurve switches in October.

Foundry followed with three switches, also set to ship next month (NW, Aug. 23, page 22). The largest of the three holds up to 64 ports of copper Gigabit Ethernet.

FlowWise introduced a card for Cisco routers with a mix of copper gigabit, fiber gigabit and Fast Ethernet ports (NW, Aug. 30, page 10). Shipments are planned for November.

At this time a year ago, vendors were hoping to have products ready by the end of 1998. But they were set back by the complexity involved in squeezing a gigabit of data onto the Cat 5 cable. Part of the problem is that copper gigabit's physical-layer technology is untested in the real world, while fiber gigabit builds on technology developed for Fibre Channel.

It seems more likely that vendors will meet their objectives for shipments this year, given that the physical-layer chips are now available. ■

The copper gang

These vendors are showing Cat 5-based Gigabit Ethernet gear at Interop. The products run the gamut from switches and NICs to cabling and connectors.

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Cabletron
Extreme Networks
FlowWise Networks
Foundry Networks
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— Headline in *The Weekly World News Special* 76-page collectors edition, Sept. 7, page 15

If I have to go to the supermarket, midnight is my preferred time. No crowds, no crying children and rarely a queue. Of course, no queue means I can't browse the various fine journals available at the check-out. Journals such as *The Weekly World News*, which carried the gem above as well as my previous favorite: "Hubble Space Telescope spots Heaven" (with a photo).

Now I figure that if *The Weekly*

World News can get away with blatant nonsense, er, sorry . . . can report objectively and accurately on important events, then so can we at the Gibbs Weekly Network Obfuscator. Our stories this week:

VATICAN DECLARES OPERATING SYSTEM TO BE WORK OF SATAN —

THE VATICAN — Aug. 31. In an unusual and significant move, the Pontiff has declared that the Microsoft Windows family of operating systems is the work of the devil. A recently released papal encyclical declares that the repeated crashing and misbehaving of Windows applications can only be attributed to malefic forces. In the encyclical, the Pope advises Catholics everywhere to switch to Linux as soon as possible.

INDUSTRY LEADER SUFFERS FROM RARE MEDICAL CONDITION — **REDWOOD SHORES, CALIF** — Aug. 31. Oracle has revealed that Chairman and CEO Larry Ellison has been unable to leave his office for the last 24 hours due to a rare and serious medical condition: Inflatus Ego-sis. Inside sources report that the skull of the highly visible and opinionated industry executive is now so large that builders have

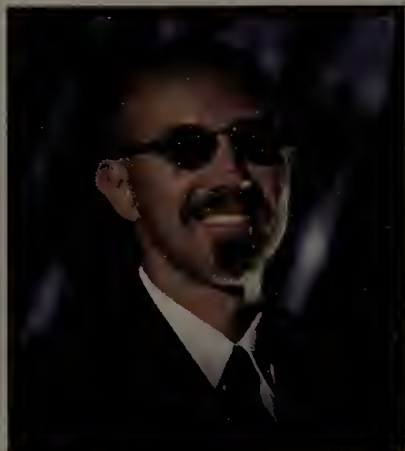
been called in to demolish walls to free Ellison.

IBM TO REORIENT BUSINESS — RESEARCH TRIANGLE PARK, N.C. — Aug. 30. In a surprise move, IBM today announced a far-reaching corporate repositioning. A company spokesman announced that following the recent decision to get out of networking through an agreement with Cisco, the board had examined other key business areas and decided to get out of computers altogether. Inside sources say the company is considering entering the world of women's fashions and cosmetics.

MICROSOFT DISAPPEARS IN COSMIC EVENT — REDMOND, WASH. — Aug. 30. The first black hole ever seen in this part of the universe has been discovered where the campus of computer industry giant Microsoft was previously located. Black holes, predicted by physicists and inferred from phenomena observed in remote galactic formations, are thought to be the result of huge amounts of matter compacting to the point at which no matter or light can escape due to the intense gravitational pull. NASA investigators at the site theorize that the sheer volume of money flowing into the corporation created adequate mass to spontaneously trigger the anomaly.

AOL OFFERS ALTERNATIVE DISPUTE RESOLUTION, REJECTS COURT DECISION — NEW YORK — Aug. 31. In a surprise move, America Online Chairman Steve Case challenged AT&T Chairman C. Michael Armstrong to a duel to the death over a recent legal defeat. An AOL company spokesperson said the summary judgment against AOL, which had tried to claim the phrases "You have mail," "IM" and "buddy list" as trademarks, was unacceptable and Case would only relinquish his company's claim through manly combat. Armstrong has yet to accept the challenge although industry commentators say the duel will occur if Armstrong gets to select the location and choice of weapon.

Elvis sightings to nwcolumn@gibbs.com



MARK GIBBS



The latest on the Internet/intranet industry

They are, in effect, the drunken drivers of Internet investing and Peter Ziebelman has just the phrase to describe their "crime": VUI.

As in "venturing under the influence."

A partner at 21st Century Internet Venture Partners, Ziebelman has taken to using VUI to describe a range of sins among his venture capitalist brethren. The misdeeds include swallowing bad business models; ignoring red flags, such as an absence of barriers to entry; and succumbing to the kind of peer pressure that leads to ill-conceived pack investing.

"There's no 12-step program here,"

Ziebelman says. "Only a massive price correction for public Internet stocks" will "cure" those who are afflicted.

So what are the best examples of VUI? Ziebelman would rather not drop a dime on specific investments — honor among venture capitalist thieves, he says. Fortunately, columnists have no such qualms about kicking drunks who are headed for the gutter.

Internet police looking to make a VUI pinch have many suspects to target, but they might start with auction sites not named eBay, medical-advice "communities" such as drkoop.com and any online pet store.

Take Pets.com, for example, the so-called market leader. Perhaps you've seen their brilliant new TV ads featuring that hilarious hand-puppet dog and the catchy slogan: "Because pets can't drive." The spot is bound to win one of those advertising awards that only advertising professionals care about.

The business itself? Pure bow-wow.

Why? Because pet owners *can* drive and the corner grocery store carries most everything my Siamese and 6-month-old Corgi pup need, except perhaps advice on how those two can get along.

Cabletron sent me a baby rattle in the mail. Why Cabletron sent me a baby rattle I have no idea, except perhaps that **NetWorld+ Interop '99 Atlanta** is being held this week and vendors will try almost anything to grab press attention leading up to such events.

Nexal Corp. sent me a squirt gun. We are not talking about the wimpy kind of squirt gun that many of us played with as children/future NRA members. No, this bad boy could be used to clean vinyl siding or contro an unruly crowd. Why Nexal sent me a military-style squirt gun is also unclear, mostly because my fascination with the toy kept me from ever reading the press release that came in the Federal Express box.

An outfit called **Telemate.net** sent a colleague a backpack full of "N+I survival" goodies, stuff like foam insoles, Tums and even a sewing kit. Thoughtful, yes, but Telemate.net violated the first rule of sucking up to the press, which is: "Make sure you suck up to all the reporters and editors lest you offend the wrong one." I can't wait to find out what Telemate.net does, so I can write something nasty about the company.

Of course, when it comes to getting journalists to stand up and take notice, nothing does the trick like good old-fashioned free liquor. OK, there is one possible exception: free liquor and a massage. **Seattle-based software maker WRQ** will host its second annual "Martinis & Massage" press and analyst reception this week in Atlanta.

Hmmm, maybe it's time for Buzz to take a good hard look at that latest Web-to-host software from WRQ.

Here's the worst URL/online company name these eyes have stumbled across in recent memory: ishophere.com.

At first glance, I took it for ISH-o-sphere.com, even though there is no second "s". My next attempt was ISH-o-fear.com.

Fortunately, **Network World Senior Editor Denise Pappalardo** provided a pronunciation guide in the story she wrote that mentioned the company. The name is pronounced: I shop here. Dot com.

That's called naming under the influence.

As you can tell, Buzz is deep into another one of his cranky spells. You can brighten his mood by conveying an Internet news tip or gossip item to him at (508) 820-7471 or buzz@nww.com.



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